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COMPUTERWORLD

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Computerworld and the Data Processing Management Association team up with a comprehensive MIS salary survey. Almost 1,500 MIS professionals in 25 job categories rate their salaries and benefits.

NCR props up Tower

Responds to 32/800 problems with free upgrade

BY JAMES CONNOLLY
CW STAFF

DAYTON, Ohio — Reacting to weak benchmark results and user complaints about poor performance, NCR Corp. last week confirmed that it will offer free retrofits to users of its 6-month-old multiprocessor Tower 32/800.

The changes, which start with the replacement of a Motorola, Inc. 68010 microprocessor with a Motorola 68020 chip, could mean tenfold performance gains for some users, according to an independent benchmark.

The 32/800 was announced in February as the most powerful member of the Unix-based 32-bit Tower family but scored poorly in an independent benchmark report issued three months later [CW, May 11]. According to an NCR official, the system has performed well in most cases but has not tested well in specific areas, such as the file processor's handling of small record blocks.

Degraded experience

"When we first released the 32/800, we discovered in our own internal testing that the file processor would not provide the performance required in certain situations," said Van Aggelakos, director of product management for the Tower product line. He said a few customers complained that the weakness caused performance to degrade in situations like selected data base applications.

The 32/800, which features an architecture in which power is added in increments with extra

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Ada drive stalling at DOD door

BY MITCH BETTS
CW STAFF

Seven years ago, the U.S. Department of Defense launched a rich, powerful programming language called Ada that supporters preached would revolutionize the world of software design and maintenance.

Today, experts say Ada will gradually make modest inroads both in its intended military market as well as in commercial markets — but no revolution is in sight.

"In fact, there is ample reason to believe that the Ada marketplace won't begin to approach its incredible potential until the mid- to late 1990s, if at all," says Peter Burris, a software research analyst at International Data Corp. in Framingham, Mass.

Ironically, Ada — the product of a billion-dollar investment by the DOD — is struggling most noticeably on its home turf. It seems more popular in European banks than in some DOD offices,

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Microsoft board to Excel-erate 8088s

BY DOUGLAS BARNEY
and KATHY CHIN LEONG
CW STAFF

NEW YORK — Microsoft Corp. last week laid a hardware foundation for the imminent debut of its PC Excel integrated spreadsheet. The company announced the Mach 20, an accelerator board that will also allow low-end microcomputers to run both PC Excel and Microsoft's MS OS/2.

Microsoft is also expected to announce today a new version of Microsoft Mouse.

The products represent a step toward broadening the base of machines capable of running PC Excel, the unannounced integrated spreadsheet package that will require an Intel Corp. 80286 microprocessor and a mouse to achieve acceptable performance.

In addition to allowing Intel 8088-based machines to run Excel at acceptable performance levels, the Mach 20 will let existing personal computers run MS OS/2, Microsoft's next-generation operating system scheduled for availability next year.

Microsoft hopes to entice users of 8088-based machines to buy PC Excel by bundling the software with a mouse and a Mach 20 speedup board for about $1,000, according to a source briefed by Microsoft.

Gates leaves it open

Although Microsoft Chairman Bill Gates declined to confirm or deny the reports, when asked when users would be able to buy a version of PC Excel for 8088-based machines, he replied, "Maybe when you can buy the Mach 20. Let's just say sometime in the future."

The board is scheduled to be available by Sept. 21. Microsoft declined to provide details of the new Mouse or to confirm the announcement.

The bundling offer would also be Microsoft's trump card in convincing users of existing personal computers to migrate to OS/2, the operating system jointly developed by IBM and Microsoft. Like PC Excel, OS/2 requires an 80286 microprocessor, making it unusable by

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MAINFRAME SOFTWARE

An industry restructures

BY CHARLES BABCOCK
and MICHAEL SULLIVAN-TRAINOR
CW STAFF

First in a two-part series.

Until last year, Applied Data Research, Inc. in Princeton, N.J., was enjoying a 25% annual growth rate, considered typical for mainframe software houses through much of the 1970s and '80s.

Then, in 1986, the cushion of growth collapsed like a flat tire. Revenue that had been $150 million the year before and was expected to reach $187 million fell to $132 million instead. By the end of 1986, ADR was cutting staff and had installed a polished, young executive from its new owner, regional Bell holding company Ameritech.

ADR's experience is typical of the troubles that have plagued major mainframe software vendors during the last two years. Estab-

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Mainframe data bases

The leading vendors slice up the rest of the pie after IBM takes more than 60% of the total

CW CHART: AMY J. SWANSON

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Out of the closet. DEC's new net scheme integrates Disoss, Profs and SNADS in Decnet V, while HP concentrates on its 10M bit/sec. Ethernet LAN, which connects PCs and hosts across common unshielded twisted-pair wiring. Pages 4, 6.

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CHARLOTTE LEGATES
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Share meets in Chicago

IBM users find support, product directions

BY JEAN S. BOZMAN
CW STAFF

CHICAGO — More than 4,600 IBM mainframe users converged on Chicago's Loop last week as the Share, Inc. users group met to discuss future product directions with hundreds of IBM technical specialists.

Some users said they found comfort in numbers, which gave them the confidence to question IBM. They also used the forum to weigh their own plans to procure IBM hardware and software products.

"Coming to Share gives you a sense of the collective power of users," said one attendee from Texas. "When you sit down with IBM on an individual basis, you have no idea whether your problem is unique or not. Here, you can see that you are not alone."

Because IBM actively seeks feedback from Share users on many systems products, the meeting served as a forum for complaints about existing products. Share members presented IBM with a list of requests for product improvements.

At each of its several meetings every year, Share solicits such requests and presents them to IBM. It then compiles IBM's responses and circulates at future meetings a set of documents that brings users up to date on IBM's intentions.

According to Share documents circulated last week, IBM has already accepted users' idea of enhancing initialization procedures for its VM/CMS environment and providing better support for CMS under its VM/XA operating system. Both changes, which IBM plans to announce soon, had been requested by Share members during 1986.

Also on the list were items that IBM has assured Share are future product objectives. Among those goals, requested by Share during the last five years, were the following:

- A greater degree of file sharing for VM/CMS users.
- A new compiler for the REXX real-time development system.
- The development of a VM/CMS batch system.
- Improved high-level language support under CMS.
- Enhanced automatic restart capability in CMS.

Tech talk

Technical briefings dominated the conference's dozens of seminars, where topics ranged from detailed techniques for DB2 programmers to the maintenance of aging Fortran code.

Users said that keeping up with IBM technology is the single strongest incentive to attend Share meetings. "Usually, many IBM products are introduced in South America somewhat later than they are in the United States," said David Diaz, a systems analyst with the Venezuelan oil firm Lagoven SA. "We attend Share every year to see what works and what doesn't and to gain from the experience of early users of new IBM products."

Another reason users cited for attending is the opportunity they gain, through Share's special-interest groups, to share tips and techniques for programming under various IBM products.

IMS in spotlight

IBM reviewed the newest version of its fMS data base manager — Version 2, Release 2 — at last week's Share meeting.

The latest in a series of IMS products, IMS 2.2 appears to supersede IMS 2.1. Although it was announced last year, IMS 2.2 is only now beginning to ship to customer sites, IBM confirmed.

According to IBM letters to customers, IMS 2.2 provides virtual-storage constraint relief for both IMS/VS DB/DC users and Fastpath users under MVS/XA.

Part of the performance improvement stems from an increase in the size of the system's control blocks, IBM said. fMS 2.2 also includes improved buffering, which is said to speed sequential processing in IMS/VS full-function data bases. Since IMS 2.2 is becoming available shortly after the previous version, IMS 2.1, IBM is suggesting that users choose the updated version.

No hardware changes are necessary to move from IMS 1.3 to IMS 2.2, IBM said. The monthly license fee for the basic fMS 2.2 package is $3,900.

IMS 2.2 runs on a variety of mainframes, including the IBM 370 Models 158 and 168, the IBM 4341 Group 2, the IBM 3033, the entire IBM 3080 line and the newer IBM 3090 models. All of these machines must run IMS under MVS/SP or MVS/XA.

JEAN S. BOZMAN

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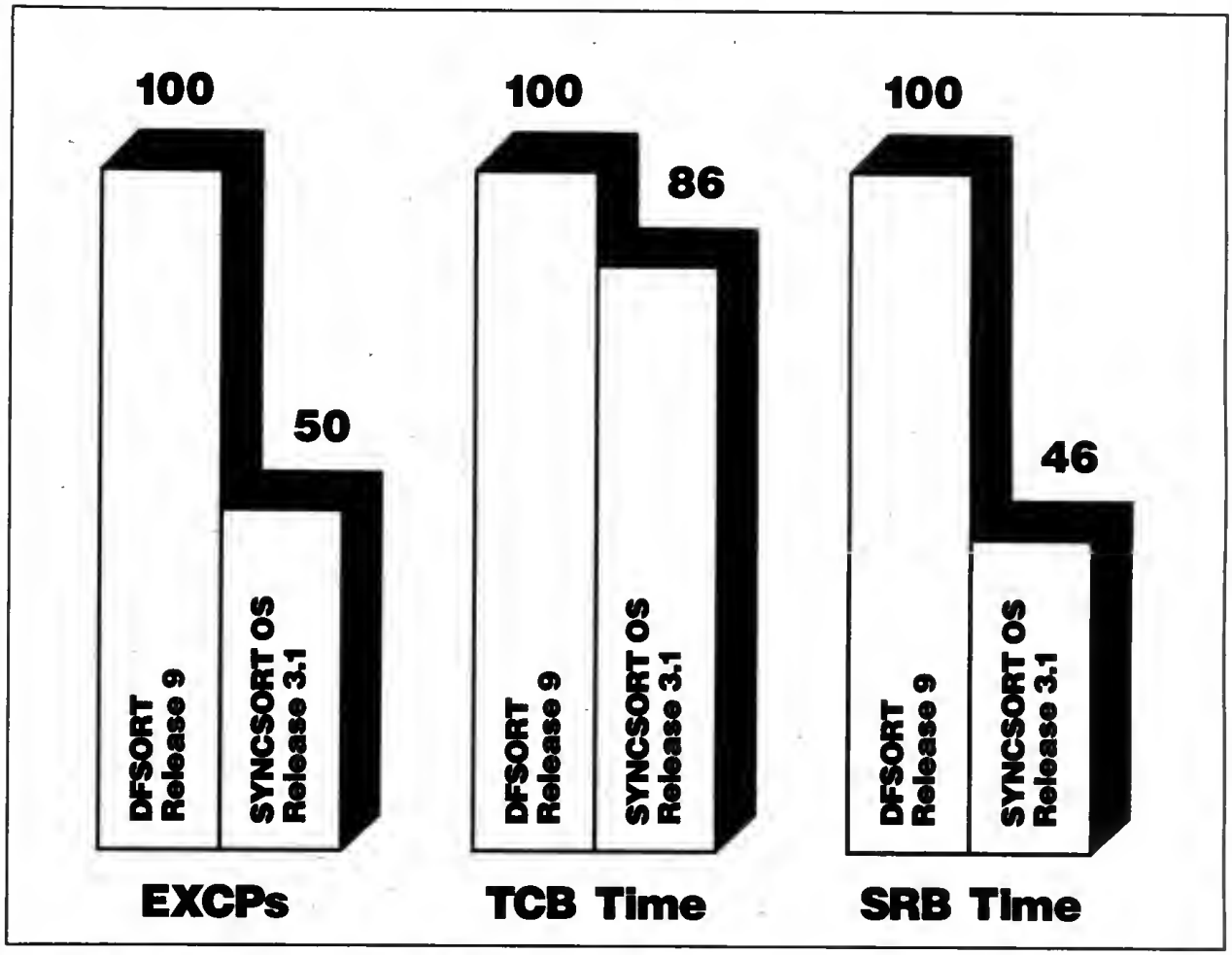

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DG extends low-end CPU line

Firm says MV/1400 DC underprices Microvax 2000 by 10%

BY JAMES CONNOLLY
CW STAFF

WESTBORO, Mass. — Data General Corp. last week extended the low end of its departmental processor line with a smaller version of its MV/2000 DC minicomputer designed to compete with the Digital Equipment Corp. Microvax 2000.

The company announced the MV/1400 DC, which DG officials claimed extends their strategy of providing systems priced at least 10% lower than DEC products. The machines will compete with other vendors' supermicrocomputers and networked personal computers, the officials said.

The MV/1400 DC uses the same single-board CPU and cabinet as the MV/2000 DC but was designed to support fewer users.

At the same time, DG enhanced the 1½-year-old MV/2000 DC and the DS/7500 graphics workstation by replacing the machines' original 256K-bit memory chips with 1M-bit chips and boosting their minimum memory from 2M to 4M bytes and their maximum memory from 10M to 12M bytes.

The MV/1400 DC was designed, in part, to provide an upgrade path for users of DG's 4-year-old Desktop Generation 16-bit multiuser systems.

"Essentially, this allows customers who have been interested in the MV/2000 DC, but for whom the 2000 was too big, to purchase a smaller member of the MV family," said Gordon R. Haff, product manager for MV integrated systems.

Haff said he expects the low-end system to be used as a departmental system by value-added resellers and large firms, which will combine the machine in networks with MV/2000 DCs.

In pitting the MV/1400 DC against supermicrocomputers sold by various vendors, Haff said, basic versions of the DG system are more complete than entry-level supermicros.

The MV/1400 DC carries a base price of $9,995 in a configuration with 4M bytes of memory, a 38M-byte hard disk drive and a 737K-byte floppy disk drive. Comparable MV/2000 DC configurations start at $19,150, and comparable Microvax 2000s cost $14,800. DG effectively raised the base price of the MV/2000 DC from $17,500 to $19,150 and added 2M bytes of memory, the floppy disk drive and a one-year warranty.

DG's low end
MV/1400 DC, MV/2000 DC sandwich DEC's Microvax 2000

	MV/1400 DC	Microvax 2000	MV/2000 DC
MIPS[1]	1	0.9	1
Memory (bytes)	4M to 8M	4M to 8M	4M to 12M
I/O bandwidth	8M bytes	3.3M bytes	8M bytes
Maximum users	8[2]	4 to 16[3]	24
Base price	$9,995	$14,800	$19,150

[1] Millions of instructions per second
[2] Refers to physical limit. The typical number of users is two to five for MV/1400 DC and four to 20 for MV/2000 DC.
[3] Four direct connections or 16 with network connections.

CW CHART

One-upmanship

The MV/1400 DC was designed to support two to five users in a typical application. It supports a physical maximum of eight asynchronous ports, 160M bytes of storage and 8M bytes of memory, compared with 24 ports, 320M bytes of storage and 12M bytes of memory offered on the MV/2000 DC.

The key limitation of the MV/1400 DC vs. the MV/2000 DC is that the new system's ports connect directly to the CPU board, while the MV/2000 DC off-loads some I/O tasks to a second or third board, said analyst Chris Hallgren of Framingham, Mass., market research firm International Data Corp.

"It seems to fit nicely into a small hole that existed in the Data General product line," Hallgren said.

IBM suits thwart PS/2 name in ads

BY KATHY CHIN LEONG
CW STAFF

In a move that underscores IBM's stated intent to aggressively defend its property rights on the Personal System/2, the company recently filed trademark-infringement suits against two leading expansion board makers.

The litigation, filed late last month without publicity, challenges the use of the PS/2 name in Orchid Technology, Inc. and AST Research, Inc. advertisements and demands that the ads be dropped. The amount sought for damages was unspecified.

Realizing that it would be a very long, hard battle to fight IBM, both Orchid, based in Fremont, Calif., and AST, based in Irvine, Calif., have stopped running their ads.

In the suit against Orchid, filed in U.S. District Court in San Francisco, IBM inferred that the PS/2 name was misused in an Orchid ad because readers would be led to believe that the memory expansion capabilities the company offered were from IBM. Orchid's ad for its Ramquest 50/60 product reads, in part, "introducing PS/2 memory expansion."

A source at Orchid said the company had canceled the campaign before the suit was filed in court and that miscommunication with IBM led to the filing.

Products not contested

"Nothing is wrong with our products," the source said. "The suit is just about the ad." Meanwhile, AST pulled a print campaign that read, "PS/2 memory — our name says it all," as well as ads that endorsed its Rampage/2 and Advantage/2 memory boards. IBM had objected to the phrase "PS/2 memory" and said AST violated IBM's trademark by using the designation "/2" in product names.

Dennis Leibel, AST vice-president and treasurer, said the firm stopped the ads right after the suit was filed in U.S. District Court in Los Angeles. "Our ads acknowledged that the PS/2 was a trademark of IBM, but IBM objected to the way we used the name for the slogan and the name of the products," he said.

According to Leibel, the slogan will be replaced, but AST intends to keep the names Rampage/2 and Advantage/2.

"We disagreed with IBM, but it didn't hurt us to change the ad," he said. "We are talking to IBM about keeping the name of the product. We're confident the issue will be resolved favorably."

DEC preps network product parade

BY ELISABETH HORWITT
and STANLEY GIBSON
CW STAFF

After months of comparative inactivity on the networking front, Digital Equipment Corp. is expected to use next week's Decworld as a forum to announce a spate of communications-related products — including an enhanced Decnet with built-in IBM connectivity and network management and 10M bit/sec. Ethernet on twisted-pair wiring.

Computerworld has learned that the Decnet announcement, reportedly scheduled for Sept. 9, will provide Decnet-resident links to IBM's Distributed Office Support System (Disoss), Professional Office System (Profs) and Systems Network Architecture Distributed Services (SNADS) networking products.

Those products and a discussion of future product directions will lay the groundwork for DEC's networking strategy into the 1990s, according to a source at DEC. The new networking scheme will integrate Disoss, Profs and SNADS into Decnet, the DEC source said.

John McCarthy, of Cambridge, Mass.-based Forrester Research, Inc., said he had learned from DEC sources that the company plans to introduce Decnet V, with "further embellishment" of network management functionality designed to counter IBM's network management system, Netview. He emphasized, however, that DEC will keep its system distributed rather than try to duplicate IBM's hierarchical management architecture.

McCarthy also said that DEC plans a Decworld announcement of a VAX-resident gateway between its All-In-1 office automation software and Profs. "DEC has been using Soft-Switch, Inc.'s [IBM-resident] gateway, but it has to offer its own to be competitive with Data General, Wang and the rest," McCarthy commented.

Another planned Decworld announcement, McCarthy said, is an upgraded Decnet/SNA Gateway that will run on a VAX. The current gateway, which runs on a DEC PDP-11, only handles 7K to 10K bit/sec. data rates, according to a recent benchmark test by Intel Corp.

"DEC has to offer a faster gateway if it wants to get into major IBM accounts," said David Terne, editor of Patricia Seybold's "Network Monitor" newsletter and president of Boston-based Newport Consulting. "What it really needs is a channel-based gateway." DEC is rumored to be working out a marketing agreement with channel-based network vendor Fibronics International, Inc.

George Colony, president of Forrester Research, said he is expecting an announcement of 10M bit/sec. Ethernet to run over twisted-pair telephone wire. Previously, DEC had sold Ethernet to run only over special coaxial cable.

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Computer Associates slashes 300 Uccel jobs

BY CLINTON WILDER
CW STAFF

DALLAS — Moving swiftly to consolidate the software industry's largest merger to date, Computer Associates International, Inc. last week dismissed 300 Uccel Corp. employees — 25% of the firm's work force.

The announcement came just five days after Garden City, N.Y.-based Computer Associates was given clearance by the Department of Justice to complete the acquisition of Uccel in an exchange of stock valued at $760 million. Uccel spokesman Richard Hanlon said the layoffs were concentrated in middle management and clerical positions; direct sales, field service and software development employees were not affected.

Hanlon also confirmed that two Uccel vice-presidents will be leaving the company after an unspecified period. Resigning are Peter J. Barris, vice-president and general manager of the Systems Software Division, and Michael G. Cocks, vice-president and general manager of the London-based International Software Division.

Seen coming

Although the speed of Computer Associates' action surprised some analysts, the idea of a major Uccel work force reduction did not. Computer Associates Chairman Charles Wang "told Uccel employees from day one that corporate headquarters would be the biggest risk," said Jim Poyner, an analyst who follows Uccel for Dallas investment firm Rauscher Pierce Refsnes, Inc. "Uccel had about $10 million in management overhead, and it was no surprise that Computer Associates would want to get rid of $7 million to $7.5 million of it," Poyner said.

One hundred jobs were eliminated in Dallas, where Uccel previously employed 600. One hundred other layoffs were divided among six U.S. locations, including Boston, Chicago, Herndon, Va., and San Jose, Calif. The remaining 100 positions were eliminated overseas.

The layoffs also included approximately 20 employees in Uccel's Banking Applications Software Division, based in Dallas and Maitland, Fla.

"The total number was higher than we expected," said Ted Jastrzembski, a software analyst with International Data Corp. in Framingham, Mass. "They must have found more duplication than they expected. But announcing the cuts as fast as they did was kinder than just letting these people dribble away."

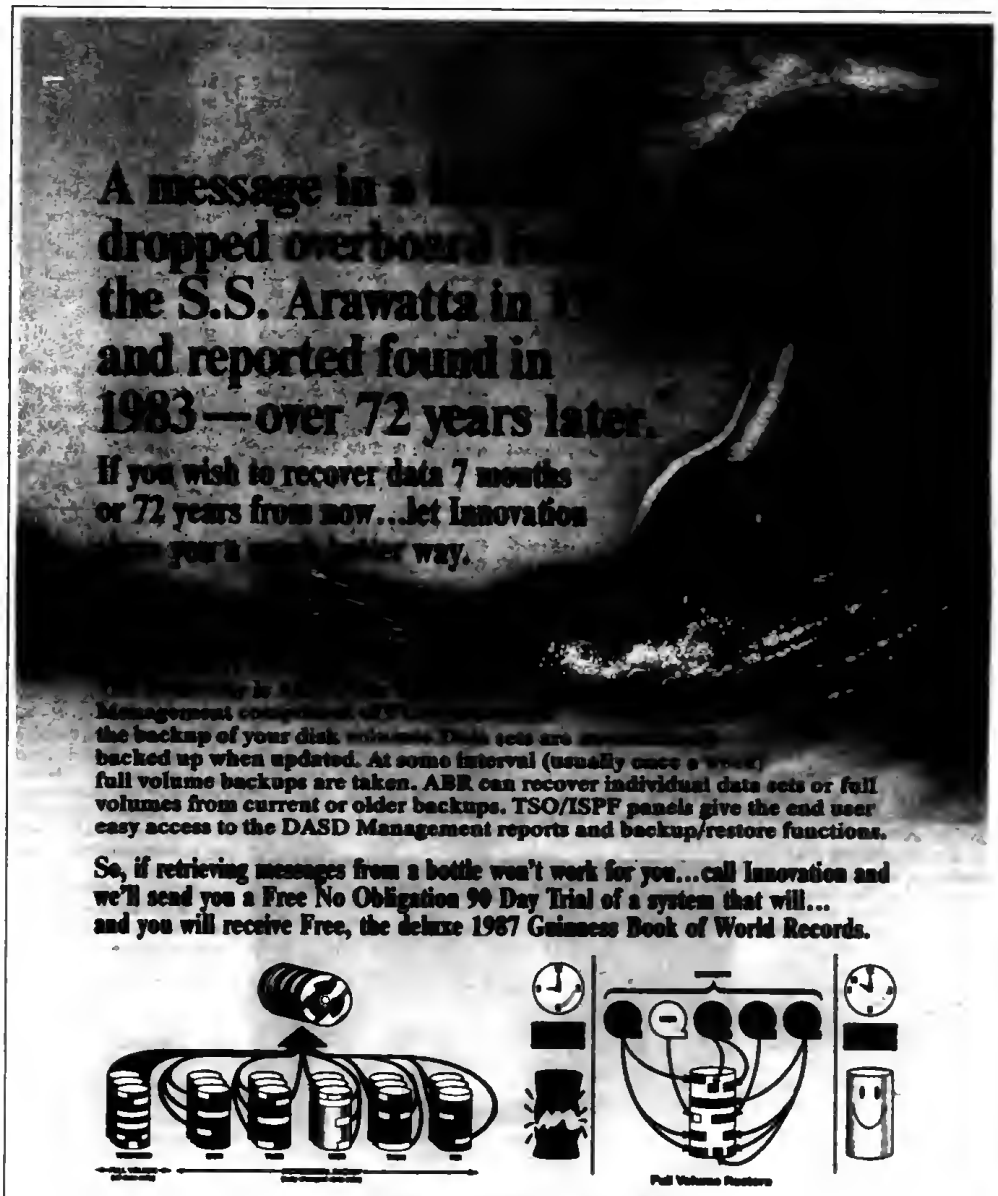
Computer Associates said no further layoffs are planned. However, the Uccel and Computer Associates sales offices in certain cities may be combined, depending on office lease terms and other factors.

Most of the layoffs involved Uccel middle management employees who were responsible for a specific function that was duplicated within Computer Associates, such as accounting, according to Hanlon. "These aren't just secretaries they're getting rid of," Poyner said.

Poyner expressed confidence that Computer Associates will be able to retain most of Uccel's sales force if it wishes. "What other company can you name in which a marketing guy has as many systems products to sell?" he said.

Uccel will keep its plans to move into a new leased corporate headquarters in the Dallas suburb of Las Colinas. That indicates Computer Associates intends to maintain much of Uccel's key organization and its product line, Poyner said.

"They don't want to run anyone off," Poyner said. "In the next two years, I don't think they'd do anything radical on the Uccel products. They saw very graphically where Uccel messed up when they tried to drop support for [mainframe security package] ACF2. Computer Associates didn't get to where they are today by hacking off clients."



HP's 10M bit/sec. LAN needs no special wiring

BY ELISABETH HORWITT
CW STAFF

Hewlett-Packard Co. will formally announce today the first large-system vendor to announce a 10M bit/sec. Ethernet local-area network that will connect its hosts and workstations across ordinary unshielded twisted-pair wiring.

The HP Starlan 10 will allow users to support high-speed applications and workstations — particularly the new wave of Intel Corp. 80386-based personal computers — without the need to install new building wiring, according to Bernard Guidon, a vice-president in HP'a Information Networks Division. Companies can use their buildings' existing unshielded twisted-pair wiring in 80% of all cases, be added.

Hadson Gas Systems, Inc. in Irving, Texas, has already installed HP'a 1M bit/sec. Starlan to link IBM Personal Computers with HP Micro 3000XE hosts at sites across the country. The company plans to evaluate the HP Starlan 10 as a possible replacement for the 1M bit/sec. network, said Ray Thomas, Hadson's manager of office automation.

"The 1M bit/sec. Starlan is fine for normal work, but some large spreadsheets that require the full 2M bytes of memory now take up to five minutes to send," Thomas said.

Thomas said that Hadson plans to start evaluating the HP Starlan 10 in October, with the idea of eventually using the product in the place of its current network.

'Hardware plus software'

The upgrade will be inexpensive, involving only "a small amount of hardware plus software," according to Thomas.

The HP Starlan 10 will include a 12-port hub that will support IBM and HP personal computers at a cost of less than $1,000 per user, plus $100 to $150 for PC servers, Guidon said. HP'a 1M bit/sec. Starlan product is priced at $599 per user, he added.

Each HP Starlan 10 hub supports up to 12 workstations. Up to 12 hubs can be daisy-chained together at one wiring closet, Guidon said.

Host access

Another product to be introduced today is a bridge that will allow the users of the HP Starlan 10 to access HP 3000 hosts residing on a coaxial Ethernet. Guidon indicated that HP will announce an HP 3000 version of the HP Starlan 10 at an unspecified time.

The HP Starlan 10 system that Hadson said it will beta-test in October also includes an HP 3000 Starlan 10 product, according to Thomas.

The HP Starlan 10 is scheduled to ship in the first half of 1988.

Networking vendors Synoptics, Inc. and 3Com Corp. also market 10M bit/sec. unshielded twisted-pair Ethernet products.

Synoptics' offering is available now, while 3Com's product is scheduled to ship this fall, the company said.

'A definite advantage'

"As the first major computer vendor to bring 10M bit/sec. twisted-pair networking to the marketplace, HP has a definite advantage," said Craig Symons, vice-president of the small computer systems group at the Gartner Group, Inc., a Stamford, Conn., research firm.

"If Digital Equipment Corp. had delivered 10M bit/sec. [Ethernet] over twisted-pair wiring some time back, they might have headed off the IBM Token-Ring craze," Symons said.

The HP Starlan 10 is compatible with and can communicate with HP'a existing 1M bit/sec. Starlan network, according to Guidon.

This compatibility will enable users to mix and match 1M and 10M bit/sec. network hubs on the same twisted-pair system.

The HP Starlan 10 is said to support distances of up to 325 ft between wiring closets and workstations. "This is crucial because a recent AT&T-Northern Telecom, Inc. study found that 80% of user workstations are within 300 ft of the nearest wiring closet," Guidon noted.

Haggling on standard

HP presented a proposal for its HP Starlan 10 system at a recent meeting of an Institute of Electrical and Electronics Engineers, Inc. subgroup formed to discuss the viability of a 10M bit/sec. Starlan standard.

Other vendors' reactions to HP'a proposal were positive overall, according to Bernard Guidon, a vice-president in HP's Information Networks Division.

However, the IEEE subgroup members moved to cut the meeting short, thereby putting off further discussion of the proposals from HP and other companies until the subgroup's next meeting, which is scheduled for September.

Product development

"A fair number of vendors that have not yet done much work on their own 10M bit/sec. products are afraid they'll have to implement someone else's network," Guidon claimed. "They may not be able to develop a product by September, but at least they'll have a position by then."

"HP's proposal has merit, but it needs to be looked at in the context of other proposals, many of which are not yet on the table," observed Glenn Goldberg, a product marketing manager for 3Com.

"3Com will definitely have a proposal, and other people in the meeting clearly had their own thoughts," Goldberg continued, "even if they were not ready to present them. The idea is to combine the strengths of many products." The standard will still take a long time to develop, "as usual," Goldberg noted.

At the September meeting, the group hopes to work out preliminary specifications for a proposal that will be put before a general IEEE meeting in November, Guidon said.

ELISABETH HORWITT

HP begins portable Vectra rollouts

BY ALAN J. RYAN
CW STAFF

PALO ALTO, Calif. — Hewlett-Packard Co. today is expected to roll out the first two portable personal computers in a line it is positioning at office and sales professionals. The units were designed as mobile devices and as replacements for desktop systems.

The HP Portable Vectra CS Personal Computer offerings include a dual 3½-in. 1.44M-byte floppy disk drive version that weighs 17.6 lbs and a 20M-byte hard-disk version with one 1.44M-byte floppy that weighs nearly 18 lbs, according to James Martin, product manager.

The dual-floppy version will begin shipping in volume in October and will sell for nearly $2,500. The hard-disk version will become available in December, he said.

Analyst Peter Heymann of Drexel Burnham Lambert, Inc. suggested that the portables' weight will not work to their advantage. "Anything near 20 lbs is still on fairly shaky ground," he said.

John McCarthy, director of automation service at Forrester Research, Inc. in Cambridge, Mass., agreed and said that while having the ability to use batteries is convenient, "it's 8086 technology. I think they would have been better off waiting until they got a CMOS [Intel] 80286" chip.

The HP Portable Vectra CS *personal computer*

Heymann added that HP is also "biting the bullet in supporting the whole IBM approach," with the IBM standards-compatible units. "It will be interesting trying to discern whether or not they will try to add value that will allow them to stand distinct in the marketplace," Heymann continued.

Heymann said price/performance will be a deciding factor in the IBM-compatible marketplace.

One way HP said it will stand apart is with the units' ability to replace desktop models in many applications. For office use, each unit's 12-in. supertwist LCD diagonal display can be detached and an external monitor attached. The included display offers 640- by 400-pixel resolution, Martin said.

He added that while the units are currently sold with the display attached, future options may include the machine without the display screen.

A full-size keyboard, compatible with the IBM Personal Computer enhanced keyboard, is included in both models.

Dual operation

The Intel Corp. 8086-compatible CMOS 16-bit processor was utilized because it allows the user the choice of both battery and AC operation of the computer, according to Martin.

The Portable Vectra CS PC is equipped with a battery that can run for up to 10 hours in the floppy configuration and up to four hours in the hard-disk model, the company claimed.

A battery fuel gauge that registers the charge on the batteries is included on both models. Recharging the battery takes 10 hours, HP said.

The fully configured dual-disk model sells for $2,495; the hard-disk version will sell for $3,595. Additional battery modules cost $250.

Revenue sags for weakened CPU company

BEAVERTON, Ore. — Financially reeling Floating Point Systems, Inc. last week reported a loss of $12.4 million, or $1.41 per share, on revenue that dipped 12% from year-earlier levels to $18.3 million.

The loss for the organization's third quarter ending July 31 included an $8.1 million charge for recent restructuring moves, particularly the closing of a manufacturing facility in Ireland, which was announced in June.

In the year-earlier quarter, the maker of array processors for scientific computing reported a loss of $2 million, or 23 cents per share, on revenue of $20.8 million.

Floating Point said revenue for the most recent quarter included several systems sales through Digital Equipment Corp. Under a recent agreement, DEC'a sales representatives sell Floating Point's M64 series machines with DEC VAX minicomputers.

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Microsoft

FROM PAGE 1

the vast majority of PCs.

The Mach 20 alleviates the microprocessor constraints and provides enough memory to run OS/2. The Mach 20, which comes with 512K bits of random-access memory (RAM), can be expanded to up to 3.5M bytes of on-board RAM, while OS/2 requires at least 1.5M bytes of RAM, according to Microsoft.

To help users of 8088-based machines move to the new operating system without compatibility problems, Microsoft is developing a custom version of OS/2 to run on Mach 20-equipped systems. This version of OS/2 is set to be available 90 days after IBM ships its version of OS/2, which is scheduled for release the first quarter of next year.

According to the firm's press materials, Microsoft is "the first company committed to porting MS OS/2 to an accelerator card for 8088-based machines." MS OS/2 is, of course, a Microsoft product.

OS/2 will run on some, but not all, 80286-based accelerator cards and will require that the operating system be ported to each vendor's card. Vendors will be responsible for porting OS/2 to operate with their cards by using Microsoft's Binary Adaptation Kit, a Microsoft official said. In the majority of cases, the vendors will also have to revise the cards in order to run OS/2.

Whereas OS/2 is aimed at the broad market of PC users, the debut of PC Excel, which sources said has been pushed back from this month until early October, is aimed directly at spreadsheet colossus and Microsoft rival Lotus Development Corp. Sources said they expect PC Excel to sell for $450.

Part of the delay in PC Excel's availability can be attributed to Microsoft Windows 2.0, which has been falling slightly behind schedule, according to a source close to the company. PC Excel requires Windows 2.0, which was to ship by the end of next month but may not ship until October, a Microsoft source said.

Windows that fit

PC Excel had experienced delays prior to the most recent setback. The product was first discussed shortly after the 1985 debut of Excel, , a highly successful Macintosh application that squeezed Lotus almost completely out of the Apple Computer, Inc. Macintosh software market. Microsoft officials at the time disclosed intentions to port Excel to the IBM Personal Computer environment through Microsoft Windows' graphical user interface.

The slowness in bringing Excel to the PC occurred largely because of difficulties in fitting Windows, along with the sophisticated application and data, into 640K bytes of RAM. In addition, the installed base of 8088-based machines ran Windows and Windows-based applications at an unacceptably slow rate, providing little incentive for Microsoft to release the product.

But the increasing number of graphics-equipped 80286-based machines, along with a rise in the average amount of RAM in PCs, has opened up the market to demanding products such as Excel, observers said. A profusion of low-priced accelerator cards, such as the Mach 20, may also boost the market for a product like Excel.

Demand for 3090 accelerates

BY CLINTON WILDER
CW STAFF

FRAMINGHAM, Mass. — IBM price/performance enhancements to the 3090 series earlier this year appear to have succeeded in spurring demand for the high-end mainframes from current IBM 3080 series users, according to a recent user survey conducted by market research firm International Data Corp. (IDC).

Polling 500 large IBM mainframe user sites in June and July on their buying intentions for the next six months, IDC found sharply increased demand for most 3090 models in comparison with its survey of the same sites in December 1986.

By contrast, demand for replacement 3081 CPUs (excluding upgrades) has fallen sharply since December, although demand for 3083s and 3084s has picked up.

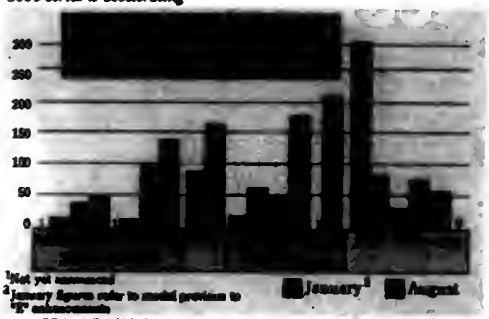
"These results look quite healthy for IBM," IDC analyst Ken McPherson said. "We should see them getting a lot of new systems installed rather than just base churn."

In the mid-range, IDC found a dramatic drop in projected demand for the highly touted 9370. Based on its 500-site survey, the firm projected that high-end sites in the U.S. intend to buy only 1,495 9370s in the next six months, a 42% drop from the projected demand for 2,588 units last December.

The survey polled only sites using IBM mainframes of 4381 power or higher, however, unlike other recent studies that have found strong overall market demand for the 9370 [CW, Aug. 10].

Moving up

Buying intentions indicate that migration from the 3080 series to the 3090 series is accelerating



INFORMATION PROVIDED BY AN INTERNATIONAL DATA CORP. SURVEY OF 500 IBM MAINFRAME SITES
CW CHART

Winter, summer plans

An IDC researcher pointed out that in the December as well as the summer survey, only a small oumber of sites said they intended to purchase any 9370s, but some of them planned significant volume purchases. Only 17 sites from the IDC sample said they planned 9370 acquisitions in the previous survey, and just 19 indicated purchase plans in the recent survey.

In the 3090 mainframe series, price/performance improvements of up to 15% [CW, Feb. 2] sparked projected purchase increases, some of them dramatic, across the entire line. The 3090 Model 150E, for example, saw projected demand more than triple from 51 units in the previous survey to 186 units.

Projected 180E purchases more than tripled from 21 to 66 machines, 200Es jumped from 101 to 140 boxes and 400Es rose from 42 to 49. Estimated demand for 200E upgrades almost doubled, from 123 to 225 processors.

"In December, we got the feeling that people were holding back, perhaps because of doubts about the economy, or they already had excess power installed," McPherson said. "But in the past six months, processing demand appears to have caught up with capacity."

Hot in June

IDC also estimated strong initial demand for the entry-level 3090 machine announced in June, the 120E, with 208 acquisitions projected. "It seems to be a good introductory box," McPherson said. He noted, however, that projected 120E demand was slightly lower than that for the Model 150 in its preavailability period one year ago.

In contrast with the generally strong 3090 demand, the projected acquisition of 3081 replacements plunged from 297 CPUs, the highest number for any category in the previous survey, to just 94. The projected number of users who plan to upgrade from a 3081 to a 3084, bowever, rose from 47 to 90.

Surprisingly, not a single high-end mainframe site polled had any plans to acquire a 4381 machine, compared with 57 projected unit sales indicated in December. But McPherson downplayed the significance of the zero figure, noting IDC's concentration on the very high end of the mainframe market.

"Ours is not a sufficieot base from which to make statements about the 4381 world," he said. "You would expect some cannibalizing of the 4381 by the 120, but it's hard to say if that is the effect we're seeing here."

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3Com, Bridge step up merger plan

SANTA CLARA, Calif. — 3Com Corp. and Bridge Communications, Inc. in Mountain View, Calif., announced late last week they had received government approval to complete their proposed merger by late next month.

The companies said the Federal Trade Commission (FTC) had granted their request for early termination of the required waiting period under the Hard-Scott-Rodino Antitrust Improvements Act.

The FTC approval signals that the companies have satisfied the notification and filing requirements of the act and are free to complete the proposed merger, subject to shareholders' approval.

3Com investor relations manager Barbara Shapiro said that both of the companies are currently receiving comments on the joint proxy prospectus by the commission.

Following the printing of the prospectus, the document will be mailed to shareholders. That will most likely happen within one week, Shapiro said.

3Com will then schedule a special shareholders' meeting at its annual gathering late next month, and a vote on the merger will be taken at that time, she added.

Bridge Communications will also call a special shareholders' meeting on the merger.

Bridge, formed this year, manufactures local-area network system products.

Paradyne tool runs T1 speeds on channel nets

BY ELISABETH HORWITT
CW STAFF

LARGO, Fla. — Paradyne Corp. is expected next month to announce a software product that reportedly will clear a long-standing bottleneck that has constricted the speeds attainable by IBM Systems Network Architecture (SNA)-based applications over IBM host-to-host channel networks.

As a "small application" running under VTAM, XL Express lets existing applications written for the host-based communications system transmit over channel-to-channel connections at speeds of 45M bit/sec. or higher, according to Paula Uselis, Paradyne's product manager.

Most other channel-based networking products, including Paradyne's existing Pixnet XL product, have been unable to make full use of a T1 link, Uselis claimed, because they are based on IBM's Channel-to-Channel Adapter.

Designed to support communications between co-located hosts, the adapter requires the sending system to get an acknowledgment from the receiving system before it can transmit the next block of data. "This can cause major propagation delays over a remote host-to-host connection," said David Passmore, a principal with Fairfax, Va., consulting firm Network Strategies, Inc.

Better use of channel speeds could be a key factor in the "high-speed host-to-host channel market, which is about to take off," Passmore added.

Adapter-based products typically attain 800K bit/sec. speeds over a channel-to-channel connection, Uselis claimed. Some vendors, such as Network Systems Corp., are said to achieve true T1 speeds through their own host software. However, such products reportedly cannot work with standard VTAM-SNA applications.

Byte blocking

XL Express reportedly circumvents the adapter, deals directly with VTAM protocols and incorporates its own blocking techniques to optimize performance running over Pixnet/XL, Uselis said. Blocking — the stringing of bytes together into a packet to be sent — has been another area in which VTAM applications have reportedly not been able to take full advantage of channel-to-channel speeds.

IBM is said to have dealt with some of the above limitations with its June 16 introductions of Advanced Communications Function/VTAM Version 3, Release 1 and 3737 Remote Channel-to-Channel Unit.

The VTAM release reportedly improves channel-to-channel performance because it "can handle larger block sizes and optimize block size according to whether communications is through a front-end processor or a 3737," claimed Roger Brzostek, senior marketing support administrator for telecommunications products at IBM.

VTAM Version 3 can also "string a greater number of larger blocks of data together and send them as one block, saving VTAM and operating system cycles," Brzostek noted.

The 3737 eliminates the need to acknowledge each block of data. It fools VTAM into acting as though it were getting acknowledgments so that it continues to send blocks until the 3737's buffer is filled, according to Brzostek.

The 3737 can handle T1 speeds in both directions concurrently. Actual throughput depends on many variables but will always be somewhat slower than T1 speeds, Brzostek said.

NTX Communications Corp. in Sunnyvale, Calif., also claimed to have circumvented the VTAM and adapter problems with its NTX 3800 series of channel-to-channel network processors, achieving speeds of up to 6M bit/sec.

Priced at $10,000 each, XL Express is scheduled to be available in the first quarter of next year.

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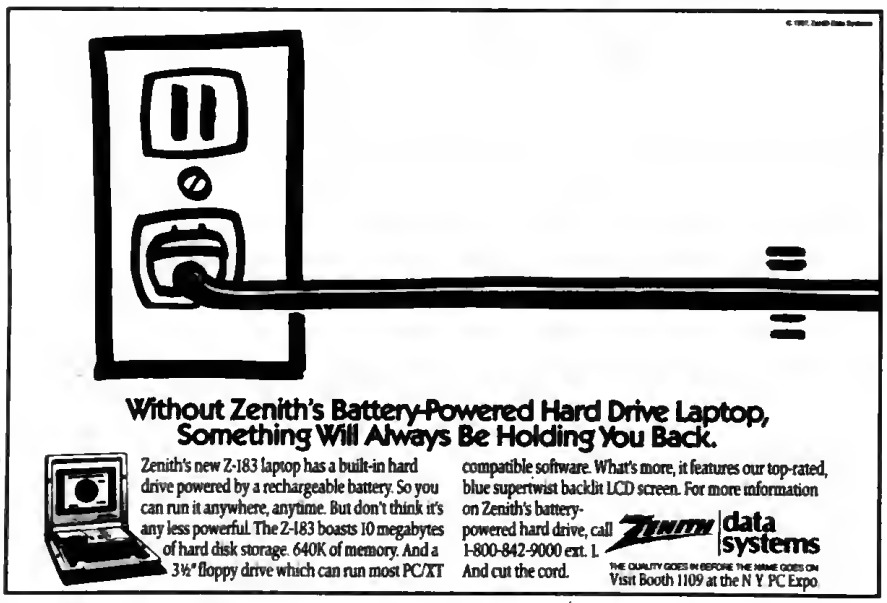

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† *Digital News*, December 1, 1986. ‡ Gartner Group currently available research.
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Restructures

FROM PAGE 1

lished mainframe data base vendors like ADR, Software AG of North America, Inc., Cullinet Software, Inc. and, to a lesser extent, Cincom Systems, Inc. and Computer Corporation of America have been hit by sagging profits and declining data base management system market share.

Among the factors contributing to what is becoming a fundamental restructuring of the large systems software industry are IBM's successful launch of DB2; slow revenue growth and dramatically shrinking profits; and management teams, many reflecting a founder's influence, that have remained deeply committed to products that were introduced 10 or 15 years ago.

At ADR, not long after selling the company to Ameritech, founder Martin Goetz stepped down to a technical post and relinquished the presidency to Ameritech executive Dennis Strigl. This week, the 41-year-old Strigl will take over as chief executive officer when current CEO and Chairman John Bennett relinquishes the former title. That management transition reflects a broad move by the mainframe software companies to adjust to the rapidly changing marketplace.

Of the 100 publicly traded software companies that he tracks, Kidder, Peabody & Co. Vice-President Bahar Gidwani says 40 firms have changed their top management in the last three years, often reflecting a passage from founders to professional business managers. Many of those that have not yet changed their management style will do so during the next five years, and some of them will do so as a result of disasters, Gidwani says.

Without changes in its accounting practices, ADR's 1986 revenue would have been close to even — or "stabilized," as ADR officials like to say — with that of 1985. But staying even represents a dramatic falloff from compounded 25% annual growth.

Staying even for software companies means living off maintenance revenues gained from sales during previous years. It indicates that new product sales are flagging and that the company's ability to conduct research and development will suffer if the initiative cannot be regained. It is the equivalent of falling behind in technology and eventually falling behind the competition, according to industry observers on Wall Street.

Although ADR officials say they were able to avoid any such fallback, an ADR customer remembers the 1985-86 downturn from a different perspective. "We started having support problems with [ADR's DBMS] Datacom/DB. We didn't know if they were going to have the resources to support us," says Woodson Hobbs, executive vice-president for data processing at Charles Schwab & Co. in San Francisco. Hobbs says ADR soon received the capital it needed from Ameritech to boost support.

Changing of the guard *at ADR saw veteran Martin Goetz (left) relinquish the presidency to 41-year old Dennis Strigl (above).*

One cause of disappearing growth at companies like ADR is the slowdown in IBM mainframe sales. When the corporate mainframe becomes the slowest growing segment of the computer business, the companies that sell software for it suffer. As a result, development teams at each of the mainframe houses are scrambling to get on top of new technology and extend their product lines to processors in the minicomputer and microcomputer arenas. In this respect, the mainframe software companies are falling back on their more innovative and aggressive roots.

'Swallowing fish'

What is different today, however, is that the industry is also undergoing a wave of consolidation. "It's like the old cartoon of the big fish swallowing the smaller fish," says Prudential-Bache Securities, Inc. Vice-President Charles Taylor. "The industry is evolving from a highly fragmented, large number of companies to a more limited number of participants."

It is the latter possibility that lends urgency to the repositioning already under way. If they do not wish to be gobbled up by a more successful competitor — as Uccel Corp. was recently by Computer Associates International, Inc. — or go out of business, the mainframe software vendors must launch new product lines while, at the same time, keeping costs under control.

As a move in the latter direction, Cullinet this month started trimming executive salaries higher than $50,000 by 5% or more, according to industry sources. In its most recent quarterly earnings report, the company stated that it lost $8 million on a record revenue, marking its fifth consecutive losing quarter.

Cullinet has said it does not expect to return to profitability until its third or fourth quarter in January or April 1988, and most of its hopes ride on a bet that the $50 million it has spent on acquisitions and new technology during the last year will move it into lucrative new markets.

"Our new products in data base, applications and tools represent a very substantial broadening of our product lines," says David L. Chapman, Cullinet's president and CEO.

Once a highflier on Wall Street, Cullinet's stock today trades at $13 per share, compared with a high of $33 in 1985 after a split and a low of $6 in the last 12 months.

Guessing where new markets will emerge is different from dressing up old products to serve existing customers, one of the mainframe vendors' bread-and-butter activities for many years.

Attempts to launch breakthrough products make today's software industry more closely resemble its roots. But in a climate of restructuring, the effort may produce some of the disasters Gidwani predicts.

"It's very tough to crack new markets. If you're in insurance, it's hard to move to health care," says Scott Smith, vice-president of Donaldson, Lufkin & Jenrette, Inc. in New York.

In some cases, the traditional mainframe houses are not anticipating new markets so much as trying to catch up with younger, more aggressive firms already occupying them.

Indeed, the mainframe data base vendors, with their investment in hierarchical, inverted-list and networked DBMSs, were slow to sense their customers' interest in relational technology.

While many of the vendors scoffed last year, IBM offered its DB2 product for a six-month free trial period.

"They used a 'Try it, you'll like it' technique, which stopped many shops from evaluating systems from independent vendors," complains Lynn Pearce, executive vice-president of sales at Software AG, producer of Adabas.

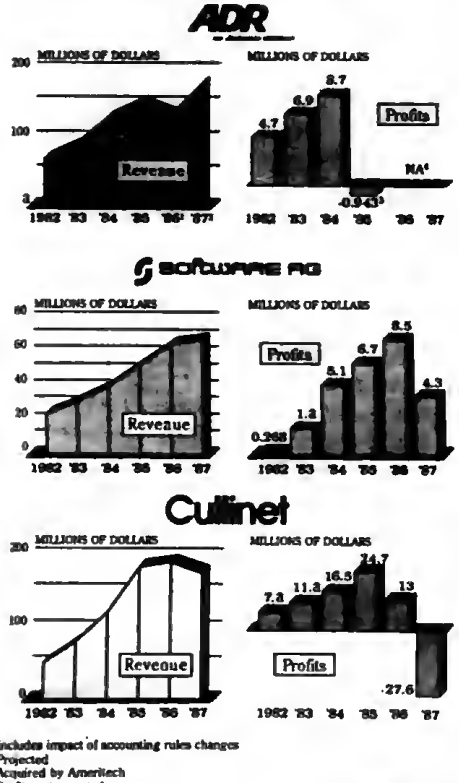
Even IBM was surprised at the result. "We're elated" at the way DB2 has caught on, said IBM's Robert F. Berland, vice-president of vendors and development operations for the firm's Application Systems Division.

In effect, IBM froze decision making on all mainframe DBMS systems as buyers evaluated DB2, according to market researchers.

International Data Corp. in Framingham, Mass., estimates that mainframe DBMS sales dropped between 45% and 78%

Trying times

Three data base vendors reflect the rigors of intense competition

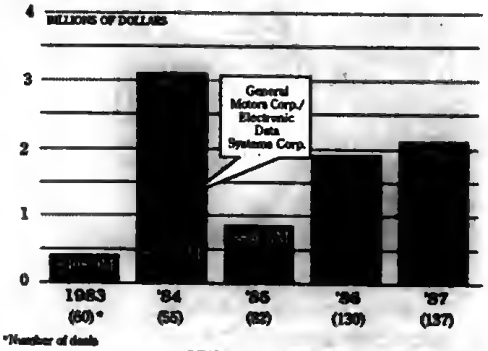


[1] Includes impact of accounting rules changes
[2] Projected
[3] Acquired by Ameritech
[4] Profits not reported

CW CHART: MITCHELL J. HAYES

Software mergers: A five-year growth path

Total value of software and services mergers and acquisitions in the first six months



*Number of deals

INFORMATION PROVIDED BY BROADVIEW ASSOCIATES
CW CHART

for each of the independent vendors that year, with the exception of Cincom and Computer Corporation of America.

Today, with IBM having sold an estimated 2,400 DB2 licenses and Oracle Corp. threatening to catch up with Cullinet's revenue with sales of its relational DBMS, the mainframe vendors are belatedly committing themselves to supplying relational products.

One DBMS market researcher, Michael Cohn of Input, Inc. in Mountain View, Calif., predicts that if Oracle and Cullinet go head to head in mainframe relational systems, "Oracle is clearly going to have an edge. There's too much brand recognition for Oracle as a relational product. . . . Cullinet is a late entry."

One way that Cullinet and several other mainframe-oriented companies have reacted to the need for new technology has been to acquire other companies. During the past two years, Cullinet has acquired five firms, including Distribution Management Systems, Inc. in Lexington, Mass., (for its expert system technology) and Esvel, Inc. in San Jose, Calif. (for its IBM SQL-based relational system).

Computer Associates entered the minicomputer marketplace and beefed up its mainframe general ledger offering by

Carnegie Group's Yablonsky

acquiring Software International Corp. in Andover, Mass., last year. The company also added graphics and spreadsheet software through acquisitions of Issco, Inc. and The Mega Group, Inc. Most recently, it signed an agreement to buy Uccel. Now the largest independent software company in the industry, Computer Associates has acquired 10 companies during the last two years.

Industry analysts say acquiring technology is one way for the established vendors to put their growth plans back on track, but it has its pitfalls.

Management Science America, Inc. (MSA), the Atlanta applications giant, appears to be integrating two recent acquisitions into the fold: Information Associates, Inc., a producer of higher education applications, and Comserv Corp., a maker of manufacturing software. But MSA is having trouble with a third acquisition, Real Time Systems in Dublin, a producer of IBM System/36 and 38 manufacturing software.

According to Prudential-Bache's Taylor, MSA planned on replacing Real Time Systems' management when it acquired the firm but found, to its chagrin, that "the sales team was every bit as bad as the management." It hired a new sales team, then ended up paying both of them as the existing sales force negotiated stiff terms of separation with MSA.

MSA will lose $10 million on the deal this year, Taylor predicts. MSA Vice-President Edwin D. Goodnight says, "Acquisitions added significantly to operating costs and resulted in a net loss" in the second quarter.

'Marketing game'

Although acquisitions have their hazards, Wall Street analysts question whether the mainframe software companies will be successful without developing a knack for making them. "It's like basic blocking and tackling. It's a marketing game — not a technical game anymore," says Paine Webber, Inc. analyst Robert M. Therrien.

One mainframe vendor that stayed apart from the rush for acquisitions at the end of last year was McCormack & Dodge Corp., the Natick, Mass.-based applications vendor owned by Dun & Bradstreet Corp. M&D will make acquisitions, says Chairman Frank Dodge, only if the target company has a strong product line that complements existing M&D products. So far, M&D's revenue has continued to grow above 25% without recent acquisitions, he says.

The net effect of acquisitions is to reduce the number of brand names that customers must confront in running their installations.

Through development and acquisition, Computer Associates has put together a set of system utilities and performance monitors that it markets together as CA-Unicenter.

Large users seem to prefer the simplicity of a single supplier. Frank Leser, president of Financial Technologies, Inc. in Chantilly, Va., recently bought banking applications from Hogan Systems, Inc., even though he says he knew Hogan had been "shaky" prior to its 20-year marketing deal with IBM. Leser says he "wanted to have a single vendor" to deal with in case of problems.

Dennis Yablonsky, ex-president of Cincom and now president of the Carnegie Group, Inc. in Pittsburgh, echoes what is on the minds of many mainframe software executives as they scramble for new positions: "You've got to be a big No. 2 or No. 3 [after IBM]. There's not room for more."

Next week: Strategies for success in the 1990s.

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Software Publishing yanks desktop package

Also withdraws high-end professional publisher, winds down push into market

BY STEPHEN JONES
CW STAFF

MOUNTAIN VIEW, Calif. — Software Publishing Corp.'s excitement over its new PFS:Professional Write Plus word processing and desktop publishing package turned to disappointment last week as the firm put the still-unshipped product in mothballs for an indefinite period.

Surprise about the announcement was compounded by Software Publishing's decision to immediately discontinue its Harvard Professional Publisher, a high-end desktop publishing program that analysts said failed to take on the likes of Aldus Corp.'s Pagemaker.

Apparently downgrading its push into desktop publishing, Software Publishing is now left with only one entry in that burgeoning market: a program called PFS:First Publisher, which has limited capabilities that confine it to the low end of the market.

Some industry watchers speculated that the delayed PFS:Professional Write Plus might also be scrapped if changes cannot be made to placate dissatisfied dealers. Software Publishing denied such claims but would not say when an improved version of the package will be released.

Originally scheduled for release this week, PFS:Professional Write Plus was criticized when it was demonstrated to about eight of Software Publishing's top dealers at an Aug. 12 meeting, sources said. The dealers reportedly said the product has limited capabilities and expressed concern that its combined features could hurt sales of the vendor's stand-alone products.

"The dealers gave it a big 'thumbs down,'" said a meeting attendee who asked not to be identified.

Awkward position

That spelled the end for the first version of PFS:Professional Write Plus, which Software Publishing President Janelle Bedke had heralded only days before as a "critically important product" for the company.

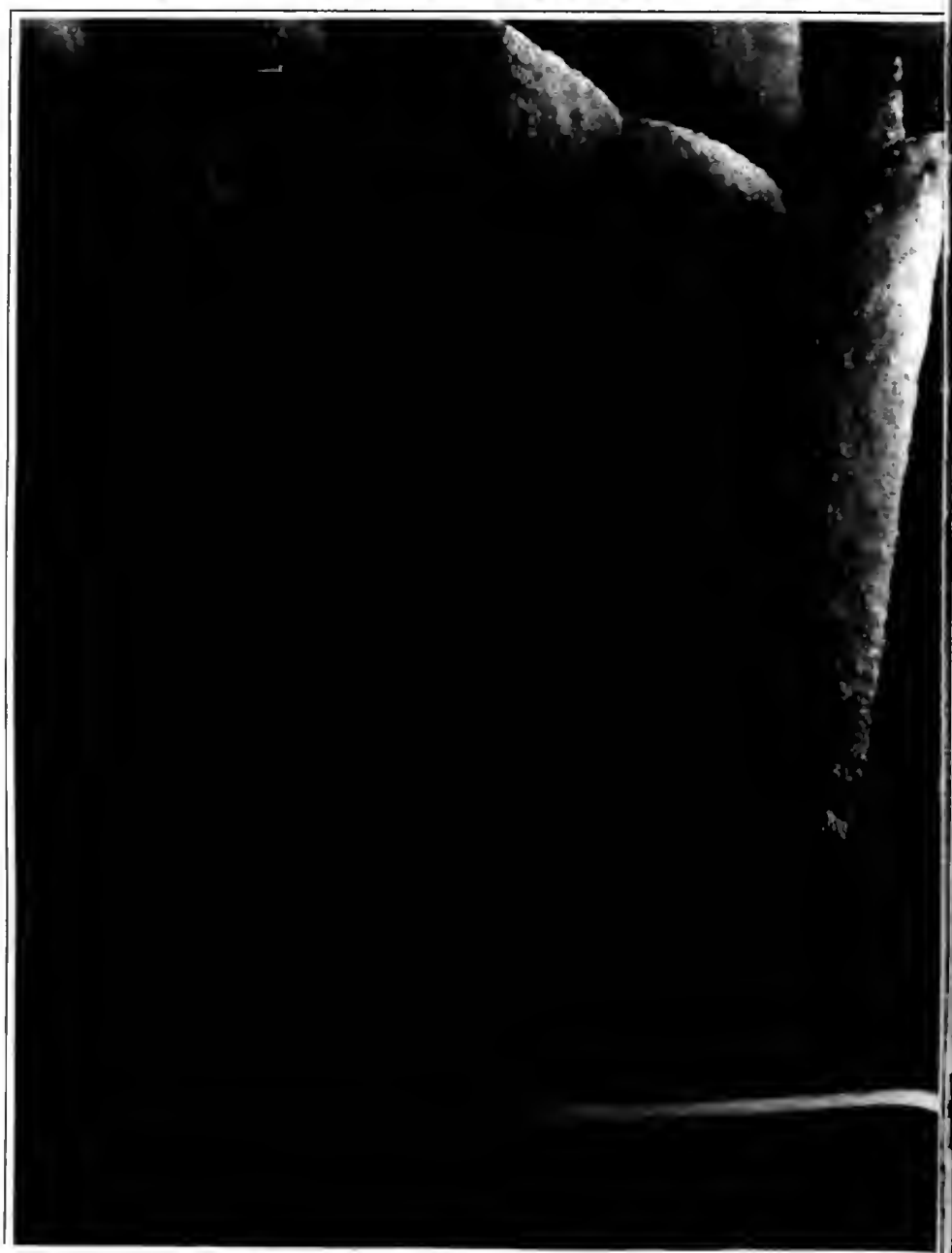
Software Publishing was left in an awkward position — forced to announce that the package would not be released just three days after the vendor had promised a September shipment. "The timing of the announcement could have been a lot better," admitted Signe Ostby, Software Publishing's vice-president of marketing.

PFS:Professional Write Plus was designed to merge the full-featured word processing of the vendor's PFS:Professional Write with its PFS:First Publisher desktop publishing package.

The product was aimed at occasional desktop publishing users who want fancy business documents but have no interest in mastering sophisticated high-end programs. Sources said bundling the two products might have frustrated dealers who feared losing current business for the individual packages.

"I would prefer to have two separate packages, because I don't think everybody wants all the capabilities of PFS:Professional Write Plus," said Ed Anderson, vice-president of marketing for the Computer Factory, an Elmsford, N.Y., retail chain that sells a broad line of Software Publishing products.

Sources said the product was hastily put together in response to leaks late last month that rival Symantec Corp. was preparing to release Q&A Write, a program similar to PFS:Professional Write Plus.



Trio targets info services

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — Ameritech, the Chicago-based regional Bell holding company, last week stuck its foot in the door of the information services market in a three-way joint venture with Bell Canada Enterprises, Inc. and Telenet Communications Corp.

The trio of vendors formed a U.S. company that will provide a network gateway to a variety of on-line data bases and electronic messaging services, using Telenet's packet network as the backbone. The Inet service is aimed at businesses, trade associations and government offices and is scheduled to begin Sept. 1.

In addition to connecting its local packet network to Telenet's backbone, Ameritech paid $5 million for an option to acquire a 15% equity interest in the venture.

However, Ameritech's financial interest in the venture is subject to approval by U.S. District Judge Harold H. Greene, because the 1984 AT&T divestiture judgment prohibits the Bell companies from offering information services.

Kenneth E. Millard, Ameritech's senior vice-president of corporate strategy,

Continued on page 15

Ashton-Tate hires to build Dbase staff

BY DOUGLAS BARNEY
CW STAFF

TORRANCE, Calif. — Ashton-Tate recently shored up its future Dbase development staff by hiring two top developers from suppliers of mainframe and minicomputer software.

The company announced that Arvola V. Chan, formerly with Computer Corporation of America (CCA), and Michael K. Benson, designer of Spectra, the query language for Cincom Systems, Inc.'s Supra data base management system, have joined Ashton-Tate to develop advanced data base products.

The move by Ashton-Tate coincides with the firm's ongoing efforts to acquire technology from a large systems software vendor.

Key component

Such technology is to serve as a key underlying component of a future version of Dbase designed to run on a local-area network (LAN) server and provide multiuser capability.

The prime candidates for a licensing agreement or potential acquisition by Ashton-Tate are Relational Technology, Inc., XDB Systems or Informix Software, Inc., according to a source close to Ashton-Tate.

With the shift to more complex microcomputer operating systems, the microcomputer data base market will evolve from single-user orientation to one characterized by LANs, data base servers and shared access to data, all areas in which Ashton-Tate has little experience.

And while Ashton-Tate has been building its development staff to reach these new markets, the firm admits it is also open to acquiring data base technology.

"We remain open to combining not just inside and outside talent but combining inside and outside products and technologies. It is not against our philosophy to look for an opportunity to get a step ahead on the strength of acquired technology," said Roy E. Folk, executive vice-president of Ashton-Tate's software products division.

According to Folk, Benson and Chan will work on the next release of Dbase, which runs in the existing Microsoft Corp. MS-DOS environment, as well as more advanced work for data bases that are intended to run under Microsoft's MS OS/2, a large-memory, multitasking operating system that is scheduled for release next year.

Connectivity concerns

"We are very concerned about connectivity between the DOS Dbase and the OS/2 Dbase," Folk explained. Ashton-Tate will offer an OS/2 product for individual workstations as well as a product that will run on data base servers.

Chan, who worked on CCA's Adaplex DBMS prototype for minis and mainframes and the Distributed Data Manager component of the Adaplex product effort, will serve as Ashton-Tate's senior scientist for distributed data bases.

Benson, the former development team leader for Cincom's Spectra, will serve as Ashton-Tate's chief architect for knowledge-based systems.

What ISDN is doing for McDonald's data networking capabilities is no small potatoes.

When McDonald's Corporation took a hard look at its telecommunications needs a few years ago, it saw 9400 restaurants in 46 countries, served by more than 20 networks. And a new restaurant opening every 17 hours.

McDonald's needed a telecommunications system that could grow with it, but one simple enough that the company could concentrate less on telecommunications and more on talking to customers.

The solution: the nation's first customer application of ISDN, the Integrated Services Digital Network, made possible by the cooperation of Ameritech's Illinois Bell and AT&T Network Systems.

McDonald's will use ISDN to send voice, data and video over ordinary telephone lines simultaneously. An AT&T 5ESS™ switch at Illinois Bell will support digital phones, integrated voice/data terminals, facsimile, voice mail, host access and modem pooling, giving McDonald's a real competitive advantage in its data networking capabilities.

"In business language, this means we're going to do an even better job for the 30 million customers that we serve every day," said Bonnie Kos, McDonald's Vice President of Facilities and Systems.

"ISDN provides an information outlet to every work station, thereby eliminating time-consuming and costly wiring, as well as enhancing messaging and network control capability."

Thanks to ISDN, McDonald's will enjoy better customer service, more current market information, better tracking of product promotions, more efficient inventory control, and reduced administrative workloads.

Ultimately, higher level applications of ISDN on the public switched network will replace most of the company's myriad networks, linking all its offices and restaurants around the world.

As we are doing for McDonald's, AT&T and your telephone company can help your business realize the networking efficiencies and cost savings of ISDN. To find out all that ISDN can do for you, write on your business letterhead to: AT&T Network Systems, P.O. Box 1278, Room 2966, Morristown, N.J. 07960 1278.

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Info services

CONTINUED FROM PAGE 14

said he is "guardedly optimistic" that Greene will grant the necessary waiver.

"The Inet project demonstrates the kind of new services the Bell companies can bring to U.S. customers once the government gets out of the way of progress," Millard said.

The seven regional Bell holding companies have urged Greene to eliminate the restriction on information services altogether, and a decision is expected this fall [CW, June 29].

If freed from the court-ordered restriction, Ameritech could provide marketing support, information services and advanced network services to the Inet venture, Millard said.

Ameritech's involvement in the Inet venture is the latest of several efforts by the Bell companies to get a taste of the forbidden market.

"The Bell operating companies are testing the waters to try to learn more about data communications and the information services market," said Jerome G. Lucas, president of Telestrategies, Inc., a McLean, Va.-based research and consulting firm.

The new joint venture, called Inet Company of America, is based in Chantilly, Va., and reportedly will replicate in the U.S. the information service that Bell Canada has offered in Canada since November 1985. Inet users will dial into Telenet's network and then select from a menu of information retrieval, electronic mail and conferencing services.

Stuart B. Erskine, president of the company, said the Inet service can be customized to provide a closed system for a particular trade association or users group.

He said the service will cost $17 per hour during peak hours and $10.20 per hour during off-peak hours.

Wordperfect preps tools for 370 VM/CMS use

BY ALAN J. RYAN
CW STAFF

OREM, Utah — Wordperfect Corp. confirmed last week that it plans to introduce software for use on IBM 370 hardware running under VM/CMS during the first quarter of 1988.

While acknowledging limited demand for mainframe word processing, the company said it believes that porting key features from its current word processing products to large systems could tap a potential market for thousands of units.

"The 370 is not a machine that lends itself to full-blown word processing, but there are a lot of nice ways to use [the software on] the machine," said Pete Peterson, executive vice-president. "We're going to concentrate on file management and printing."

Doug Lloyd, executive director of large-account marketing, said, "Our indication is that most large companies are thinking of three environments: standalone personal computers, networks and also the host as a node off a network." With the software, "they can communicate in all three environments."

Wordperfect has been polling its customers about the need for a word processing text editor. "Six or nine months ago, the message we were getting from the customer base was we need software to compete with IBM's Displaywrite," Peterson said. "But now, the message we're getting is that people are not that excited about word processing on the 370."

For the first two quarters of 1987, the Wordperfect family held approximately 22% of the dollar share and 20% of the market share for word processing package sales through computer specialty stores, according to IMS America Ltd.'s "The National Computer Retail Report." Of the company's PC word processing sales, Peterson said, 80% to 85% are for IBM Personal Computers.

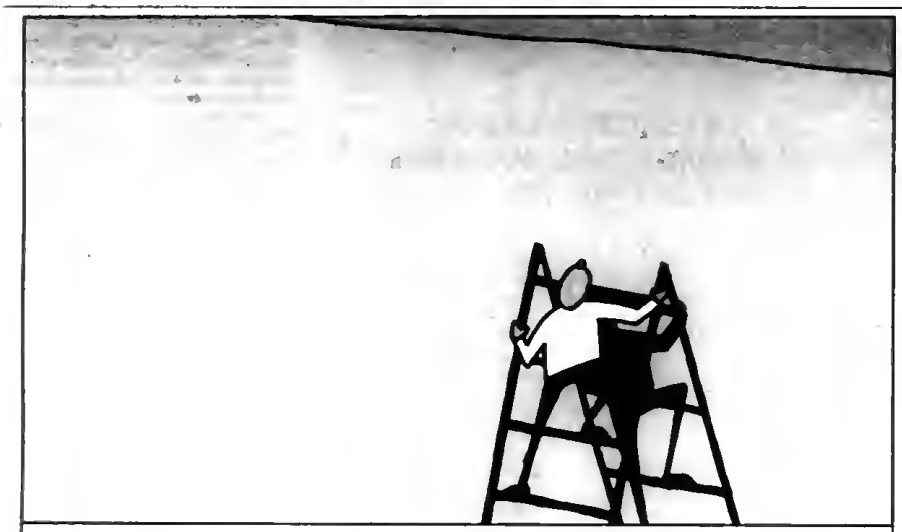
According to an internal Wordperfect newsletter, the first release of the new product, which may be called Wordperfect 370 Link or Wordperfect 370 File Management, will allow users to treat files on the mainframe as if they were files in any other directory. Also included will be a mainframe Wordperfect document file server and the ability to convert documents to and from the Wordperfect format.

Roy E. Folk, executive vice-president and general manager of the software products division at Ashton-Tate, said his firm believes it is important to interface with the most significant word processing tools, including IBM's Professional Office System (Profs) and Distributed Office Support System (Disoss) and others. "IBM has defined the Document Content Architecture that lays out the documents their machines will process," he said.

But a Wordperfect spokesman said one problem with the IBM interfaces is that they are not user-friendly. "We want the [Wordperfect] product to be friendlier to users than Disoss and Profs. Those tend to be cryptic in their command structure," said Dan Lunt, vice-president of marketing.

However, Wordperfect's philosophy is similar to IBM's in some ways, Lloyd said. "They are pushing PCs, rather than terminals, as the wave of the future because users get more functionality out of them. We're trying to optimize the host in the environment it has been designed for while utilizing the PCs."

Wordperfect software also runs on the Digital Equipment Corp. VAX under VMS and on Data General Corp. equipment under AOS and AOS/VS, Lunt said. He said a Unix version is scheduled to be released in the first quarter of 1988.



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DEC shows color ink-jet printers

MAYNARD, Mass. — Digital Equipment Corp. last week announced two low-priced color ink-jet desktop printers expected to substitute for more expensive plotters in many cases.

The new units were designed for use with DEC terminals connected to DEC VAX systems, DEC Vaxmate personal computers, DEC workstations and IBM Personal Computers.

The serial interface LJ250 printer and the parallel interface LJ252 unit list for $1,695. Key features include quiet operation, a weight of less than 10 lbs and a text printing speed of 167 char./sec.

According to product marketing manager Frits Riep, the new printers are well suited for business graphics and engineering and scientific operations. A typical application might be in defining brake drum temperatures by color, he said.

The devices print up to seven primary colors at 180 by 180 dot/in. resolution and up to 255 colors at 90 by 90 dot/in.

Riep said new optional software added by DEC enhances the output of existing applications and increases the flexibility of the printers. Called Retos, the host-resident software provides such graphics features as scaling and positioning.

The printers accept single sheets of paper, fanfold paper and transparencies.

Deliveries are scheduled for October, DEC said.

DEC VT320 late, but low price surprises

BY DAVID BRIGHT
CW STAFF

MAYNARD, Mass. — Answering competition in the ANSI text terminal market, Digital Equipment Corp. last week introduced a smaller, improved terminal priced 31% less than the popular VT220 model it replaced.

The announcement of the VT320 came at least four months later than expected, according to analysts, who had generally anticipated that DEC would introduce the terminal at last April's debut of the VT330 and VT340 graphics terminals. But the sharp price reduction from $795 to $545 was surprising to some observers.

"Nobody expected this," said Eileen O'Brien, who tracks the terminals market at International Data Corp., a Framingham, Mass.-based market research firm. "They're making a statement with this price. Some of the smaller companies cannot react to this."

VT220 a grizzled vet

DEC claims to have manufactured more than one million VT220 terminals. In 1986, with 165,000 units shipped, DEC commanded a 42% share of the ANSI text terminal market — double the share of second-place Wyse Technology — according to IDC.

But O'Brien called the VT320 a "catch-up product" because many vendors, such as Wyse, Hewlett-Packard Co. and Televideo Systems, Inc., are already selling terminals that offer a similar set of features. Product marketing manager Ralph Pecora would not explain why the product was late, merely stating that the VT320 development was on a "separate program" than the VT330 and VT340.

Scheduled for October availability, the VT320 includes a 14-in., antiglare, flat-surfaced screen said to provide higher resolution and better readability than the VT220's 12-in. screen.

When purchased with a system, the VT320 will be priced at $495. In quantities of 100, the unit price falls to $475. An international version of the terminal, with a bigger power supply and an RS-232 port, will be available for $595.

To satisfy existing contract requirements, DEC will sell the VT220 through June 1988.

FTS 2000 delayed — again

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — Under intense pressure from Congress, the U.S. General Services Administration (GSA) last week amended its proposal for a $4.5 billion intercity voice and data network and extended the bidding deadline until Sept. 30.

The action, the third delay in the Federal Telecommunications System (FTS) 2000 procurement, was prompted by a new round of criticism from members of Congress and the General Accounting Office (GAO) that the government could be locked into a single vendor for the 10-year duration of the contract [CW, Aug. 10].

Sen. John Glenn (D-Ohio), chairman of the Senate Committee on Governmental Affairs, released a GAO report that faulted GSA management and its winner-take-all approach to the program.

The GSA responded by amending its request-for-proposals document to explicitly provide an escape clause allowing the government to use other vendors after the GSA reaches the guaranteed minimum expenditure of $450 million — a point estimated to be about four years into the contract.

The GSA gave bidders a month to re-evaluate the procurement in light of the amendment.

One on one

The FTS 2000 competition is down to two bidding teams, one led by AT&T and Boeing Computer Services Co. and the other led by Martin Marietta Corp. and MCI Communications Corp. A third bidding team dropped out earlier this year due to the regulatory uncertainties and delays.

Martin Marietta, which has threatened to withdraw from the competition if major changes are made in the contract, is reviewing the latest amendment, a spokesman said. He added that the Bethesda, Md.-based firm is also trying to evaluate "whether this is likely to be the last delay."

An AT&T spokeswoman said the delay was a disappointment but that "Congress has raised some valid concerns, and we hope the 30 days provides an opportunity to resolve the issues and provide some stability to the procurement process."

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EDITORIAL

Reconstruction

Last week, *Computerworld* carried a front-page story that summarized the sweeping changes under way in the basic pricing structure of large systems software — changes initiated, for the most part, by IBM.

This week, on page one, we begin a two-part series that records other tremors emanating from deep within the very heart of the independent software market. The disturbances observed and their aftershocks are profoundly changing this market, which, for more than a decade, has seen one year of double-digit growth heaped atop another — until recently.

The good news, which part two of the series will show next week, is that the dynamics of this marketplace, driven by user demand, are reshaping some of the more venerable software companies. What's most intriguing is that these dynamics are driving companies like ADR, Cullinet and others back to the basics that made them successful in the first place.

The engine of so much of this change and of the problems the third-party market faces is IBM. This is somewhat ironic since the third-party market was born, went through adolescence and later thrived largely as a result of IBM's foibles in the software arena.

But all that has changed. IBM is playing for keeps in software. Witness the tenacity with which the company is attacking the data base market with DB2, tenacity that has caused some mainframe data base competitors' sales to plummet almost overnight.

So now many elements of the third-party software market find themselves in the difficult position of fighting rear-guard actions on the one hand — namely, struggling to prop up revenues with maintenance income from the installed base — while hammering out strategies to penetrate new markets. This situation has sent many firms on the acquisition trail and has ushered in a new generation of younger and more aggressive company managers. According to one estimate, four in 10 top management teams of the publicly traded software companies have been replaced in the last three years alone.

The revamped companies that actually succeed into the 1990s will be those that have learned the lessons of the past. Success will come to those that 1) do not underestimate IBM, 2) pay attention to customer needs and 3) understand there's more to life than mainframes.

The last two points are the most important. Increasingly, the traditional mainframe software firms are realizing that what their customers want is broad connectivity across a wide range of incompatible computer systems. IBM isn't likely to provide that, but the independents can.

Finally, mainframe software makers must again seize the reins of technical innovation. Advances in ease of use, communications, data integration and customer support are coming more and more from the microcomputing sector. The mainframe companies have the tools to compete. Now they must put them to work.

LETTERS TO THE EDITOR

Care and caution

After reading "Users give thumbs-up to 9370" [CW, July 27], I felt frustrated. While the article made it clear that there was a significant difference in performance between IBM's 4361 Model Group 5 and its 9370 Model 90, the statistics that were used did not quantify the difference.

I realize that benchmark results must be summarized, but this must be done with caution and insight. The only figures given were "percentage of CPU utilization," but this is valid for comparison only if a single factor, such as CPU or direct-access storage device (DASD), is changed. In this case, both CPU and DASD were changed, making the percentage of CPU utilization practically meaningless for the purpose of comparing the overall performance of these systems.

How much of the change in CPU utilization can be attributed to the DASD type used? How much faster did the test jobs actually run on the 9370? After reading the article, I still don't know for sure. Unfortunately, readers who did not ponder these questions may think they now know how much faster a 9370 is than a 4361.

John C. Ford
Software Developer
Davis, Thomas & Associates, Inc.
Minneapolis

Ignoring benefits

As president of Language Technology, a company whose fundamental business is helping MIS overcome "those maintenance blues," I must convey my disappointment in the Executive Report on code structuring [CW, June 29]. Unfortunately, and contrary to the article's apparent purpose, the report did nothing to advance a much needed understanding of how Cobol structuring tools are actually (and successfully) being used by hundreds of DP shops across the country.

Instead, the user roundtable was a superficial session among three individuals and a moderator who were "familiar" with structuring products, only one of whom had actually implemented and used a structuring product. Even that user did not represent a typical user, because he had only one choice in a vendor due to his former Burroughs Corp. hardware environment.

It is a shame that CW did not seek out a few of the many active structuring users when compiling the report. These users, who better represent today's head-out-of-the-sand trend toward implementing maintenance productivity tools, would have provided a much more useful and accurate view of how, when and why structuring tools are being used. What you would have found are companies that have solid productivity gains, short paybacks and return-on-investment results to report — firms that are benefiting from what is now tried-and-true technology available to all DP shops. One example is a user of our Recoder product who determined that a conservative 4% to 5% gain in programmer productivity would justify acquisition of a structuring tool. This user has experienced gains exceeding 20%.

CW has distinguished itself over the years by keeping MIS informed of important new ideas, trends and technologies. In the case of the "Those maintenance blues" report, however, you presented a viewpoint on structuring that did not reflect what is really going on in the industry today. I hope a follow-up piece based on the experience of the many MIS pros who can go beyond speculation and share some truly useful information and advice about Cobol structuring will be published.

William Engel
President
Chief Executive Officer
Language Technology
Salem, Mass.

This week in history

Aug. 29, 1977
An armed terrorist group in Milan, Italy, has singled out state and corporate computer centers as "instruments of the capitalistic system." The group has exploded bombs at 10 such facilities throughout the country in the last 10 months.

Aug. 30, 1982
The Senate passes a sweeping immigration bill that mandates development of a national identity system for employment purposes. Critics blast the move as the first step toward a totalitarian state.

Computerworld welcomes comments from its readers. Letters may be edited for brevity and clarity and should be addressed to Bill Laberis, Editor, Computerworld, P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701.

Building that same mousetrap better

MARTIN A. GOETZ

The Lotus Development Corp. vs. Paperback Software International suit is one of several cases currently before the U.S. lower courts dealing with the "look and feel" of software. The outcome of these cases is critical to the growth and competitiveness of the software products industry.

On the surface, the Lotus case appears to be limited to copyright law: Should a company using a different software program be permitted to copy the commands, functions and screen appearance of an existing program? I believe the issue is much broader. It involves competition in general and how U.S. laws can encourage or inhibit the free enterprise system.

Independent software companies have competed in the software products industry for many years using the existing U.S. copyright, patent, trade secret and antitrust laws to protect their interests. Their strategy was to build that better mousetrap and build it first.

> CAN a company build a better mousetrap by building an identical product more quickly and economically?

Today's industry software standards and entrenched software systems such as MVS, Unix, CICS, Cobol and 1-2-3 have changed that strategy. Companies now have shares of 50% or more in software market niches such as operating systems, data base management systems and spreadsheets. Also, IBM is fostering System Applications Architecture to make systems look similar and be compatible.

Most existing laws on competition were written years before the 1960s when software was first sold as a product. Today, companies producing software should be viewed as manufacturers. Terms such as maintenance, warranties, research, development, installation, training, value-added reseller and OEM are just as appropriate for a software company's product as for a manufacturer's mousetrap.

The Lotus case raises the following questions:

What guidelines should companies use when they compete in the open marketplace? Can a company build a better mousetrap by building an identical product more quickly and economically? Does the product have to look and operate differently? If Lotus wins its case, would it mean that a company could not build a competitive but identical CICS system or a competitive but identical MVS system?

A company's decision to make a product with similar or identical external characteristics is driven by whether the company is going after an existing or new market. The decision also depends on user needs and the de facto standards of that market.

For example, IBM has a monopoly on mainframe operating systems and transaction processing monitors. Undoubtedly, IBM users would welcome competition in these areas. Should a company be required to build a product competitive to MVS or CICS using different external characteristics? Better external characteristics can be built, but users demand compatibility.

Consider compatibility in the context of IBM and Microsoft Corp.'s recently announced OS/2 operating system. What if IBM and Microsoft stated that the 200-plus commands that provide the interface to OS/2 were proprietary to them? And what if users worked with these commands through interactive terminal screens? Does that mean a company would be prohibited from building a compatible system that is cheaper, more efficient or more reliable?

Fair and open competition has been the conerstone of the U.S. free enterprise system. Laissez-faire and "building the better mousetrap" have driven the entrepreneurial spirit of people throughout the free world. Building the same mousetrap more economically is in that same spirit.

But the question remains: Do U.S. copyright laws permit a software products company to build the identical mousetrap better or cheaper? This matter is the essence of the Lotus case and at least three others in the lower courts, Digital Communications Associates, Inc. vs. Softklone Distributing Corp.; Lotus vs. Mosaic Software, Inc.; and SAPC, Inc. vs. Lotus. All three cases involve the "look and feel" of software.

These cases may reach the Supreme Court before a final decision is made. Until then, confusion will reign.

Goetz is senior vice-president/chief technology officer of Applied Data Research, Inc. in Princeton, N.J. He holds the first patent for software, awarded in 1968

Circling the corporate wagons

Considering whether an uneasy alliance of capitalist businesses will work

HARVEY NEWQUIST

American industry is consortium-happy.

U.S. corporate competitors are circling their wagons to fight off foreign competition. When it appears that we are on the brink of losing every vestige of leadership in a particular industrial arena, we form consortiums. Nowhere is this trend more evident than in computers and their related industries.

The most notable consortium is actually a corporation — Microcomputer Computer Corp. (MCC) in Austin, Texas. You've read enough about its woes and aspirations here and in other places to probably not want to read much more about it at all. In fairness, though, MCC finally produced a commercial product this summer, introducing an expert system for designing semiconductors in conjunction with NCR Corp.

Backstabbers

As little as 10 years ago, consortiums might have been considered organizations in violation of antitrust and monopoly laws. Given the Reagan administration's hands-off attitude toward big business, however, companies that normally might stab each other in the back try to peacefully coexist in the name of higher ideals, namely the preservation of the American way.

The Software Productivity Consortium (SPC) was formed in 1985 by 12 aerospace companies under the direction of the U.S. military. Its purpose is to increase the efficiency of aerospace applications in three areas: reusable software, rapid software prototyping and knowledge-base systems.

The need for work in these areas results from the fact that the military's software system is on an efficiency par with its hammer purchasing system. At the time of the consortium's founding, software purchase, development and maintenance was projected to reach $25 billion by 1990. SPC was formed to look into rectifying this quagmire of computing costs.

Most of the major aerospace defense contractors joined SPC, and even if they don't succeed as a consortium, they get the chance to peek over each other's shoulders to see what their respective competition is up to.

Rome Air Development Center (RADC) formed the Rome Artificial Intelligence Consortium in 1985 to strengthen AI research in both universities and the military. Eight institutes of higher learning signed on with RADC to pursue various AI technologies and their possible development. Most of these schools are located in New York State, which brings up a significant point: Consortiums are not only good for America, they are good for the states, municipalities and towns that bid to have them located there.

Not all consortiums are such in the traditional sense. For instance, the Fort Worth Chamber of Commerce recently announced the formation of the Advanced Robotics Research Institute (ARRI). The institute is administered by the University of Texas at Arlington and specializes in applications of automated manufacturing systems utilizing methods such as robotics, AI, speech recognition, pattern analysis and related technologies.

BOB DAHM

The goal of ARRI is to spearhead American companies' immersion into these advanced technologies, something that its backers feel is necessary to revitalize U.S. industry. The founders should probably talk to Roger Smith at General Motors Corp. about that. He could tell them an interesting story about how throwing millions of dollars of advanced factory automation onto a factory floor doesn't necessarily create a better factory. Better management, on the other hand, successfully turned around one of GM's lowliest plants in northern California. But that's a different story.

So who are the participants in ARRI's consortium? There aren't any just yet. ARRI is counting on support from U.S. corporations to fund cooperative development projects. (Sounds a little like their neighbors over in Austin, doesn't it?). The institute's primary spokesman is not a renowned pioneer in the field of robotics — he's the mayor of Fort Worth, Texas.

Another even more interesting twist on the consortium approach is one recently undertaken by Artificial Intelligence Corp. The company has been one of the leading vendors of natural language interfaces for years and has decided to get into the expert system market.

This move, however, is not easy; it takes a lot of money to develop a new AI technology from scratch. So the company formed what it calls a "corporate consortium" of companies to invest in its research and development of a knowledge base management system for IBM mainframes. Each of the initial four companies are kicking in money. In return, the consortium will have first crack at trying the new system before it hits the market. It will also get six months of training on the system, plus credit toward future purchases. Artificial Intelligence Corp. is making this deal available to other companies in hopes of attracting more consortium members in the coming months.

Where does all this "consorting" get us? No one is quite sure yet. Still, it *is* hard to imagine groups of competitive companies getting together in any situation in which they would be willing to put the common good before the good of shareholders and the company itself.

However, consortiums seem here to stay — at least until they have to prove their worth by producing results.

Newquist writes and consults on artificial intelligence and other advanced high-technology topics from his office in Scottsdale, Ariz.

For reasons ranging from national security to bringing home the vision of Earth hanging silently in space, NASA remains committed to human space flight. The Unisys commitment to NASA is just as serious.

When the next Space Shuttle mission flies, NASA knows it will be handled by people who have experienced every aspect of space flight. Astronauts and ground controllers who were trained on NASA's Shuttle Mission Simulators, computer-driven by Unisys Defense Systems under contract to Rockwell International.

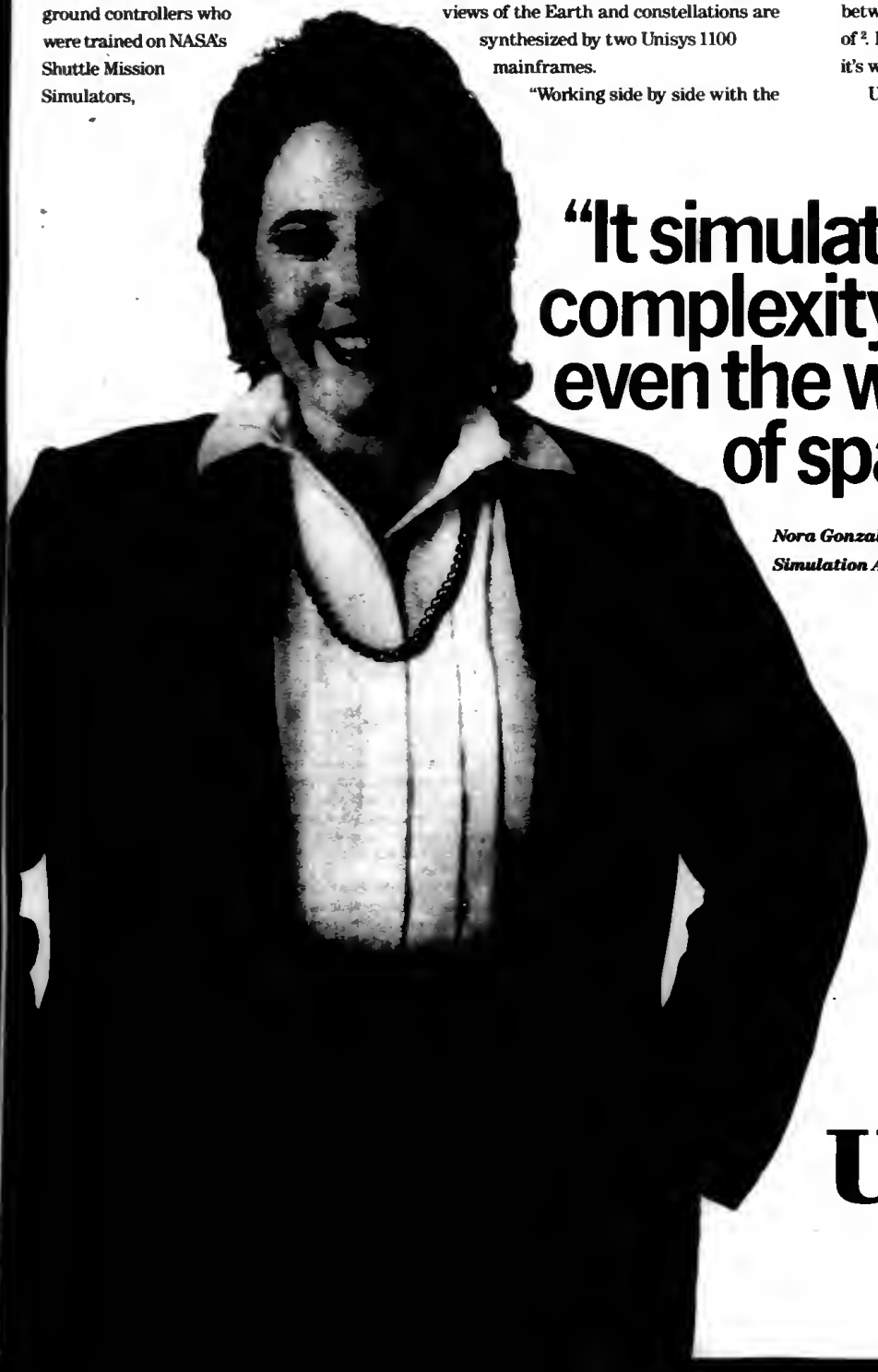
The three simulators give crews the chance not only to experience a shuttle flight, but to actually "fly" specific missions in real time.

The challenge with these dry runs is that the simulator software has to be changed for each mission. Every one of the thousands of internal systems, as well as views of the Earth and constellations are synthesized by two Unisys 1100 mainframes.

"Working side by side with the trainers on every mission profile is a mammoth task, but we've got it covered," says Nora Williams. "Over 700 Unisys Defense Systems people, all of them seasoned professionals, are on the job here full time at the Johnson Space Center.

"Of course, all these people aren't just watching the simulator. Unisys machines provide a good deal of NASA's computing power. There's a lot of coordination between Unisys and NASA. It's the power of 2. It's what NASA expects from us. And it's what we expect from NASA."

Unisys and NASA. The power of 2.



"It simulates the complexity, the feel, even the wonder of space flight."

Nora Gonzalez Williams,
Simulation Applications Manager, Unisys

UNISYS
The power of 2

SOFTWARE & SERVICES

SOFT TALK

Daniel R. O'Connell

Wait and see best tactic

Although relational data base management systems offer great flexibility and power for the user, they still have one major problem — performance. The larger the relation, the slower the response.

Because of the state of our current technology, many organizations are implementing "relational-like" data base systems or extracting data from conventional DBMSs such as IBM's IMS and importing limited amounts of the data into relational facilities.

In my opinion, there are inherent problems with both of these approaches. The benefits derived from relational-like systems as they exist today may fall far short of the cost incurred to convert to such systems. Although they provide greater flexibility than many older data base systems, they are built on the same technology. Problems such as broken chains, blown indexes and lost data are still apparent in many of these systems.

Perhaps a more severe problem is extraction of data from an older DBMS and importing the data into a relational system in limited amounts. This may have unexpected effects on the integrity and reduced redundancy of the data.

For example, I was once in-

Continued on page 24

Up, up and away: Costs hiked 40% since '84

BY ROSEMARY HAMILTON
CW STAFF

The average user will dole out nearly 40% more by the end of this year for software purchases than he did three years ago, according to a recent report by Culpepper and Associates, Inc. in Atlanta.

Culpepper's Software Pricing Trends survey indicates that the total cost of all components of a software purchase, including the software product and associated maintenance, support and training, is on the rise.

Culpepper, a consulting and market research firm, has conducted four pricing surveys since it started polling vendors in 1980.

Increasingly, vendors report that competitive pricing affects the final price tag that they put on a product. This year, vendors ranked a product's value to the customer as the No. 1 consideration when establishing a price. They ranked a competitor's pricing the second consideration.

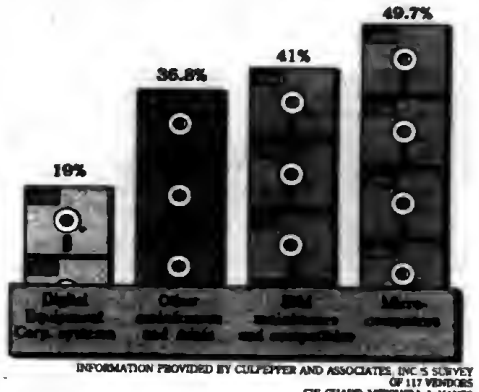
The same order held true in the 1983 Culpepper survey, the most recent prior to this year's poll.

In 1983, however, when survey respondents were asked to rate pricing issues on a 0-5 scale, with 5 indicating the greatest importance, there was a 1.5-point spread between the ranking of value to customer and competitor's pricing. This year, the spread was reduced to 0.5.

Culpepper based its findings on a questionnaire sent to 1,200 software vendors earlier this year. From that group, 117 responded to a survey that covered

Continued on page 26

Software pricing
Average increase from 1984 to 1987 by hardware environment



INFORMATION PROVIDED BY CULPEPPER AND ASSOCIATES, INC.'S SURVEY OF 117 VENDORS
CW CHART: MITCHELL J. HAYES

Unisys hot on 4GL intros

Second debut in a month aims 4GL at B25s

BLUE BELL, Pa. — Unisys Corp. made its second fourth-generation language product announcement this month with the recent introduction of PDS-Adept, a program and data base generator intended for three different operating systems.

PDS-Adept is made by Parameter Driven Software, Inc. in Detroit. Unisys said it will market the product for its B25 workstations that run under Unisys's BTOS operating system as well as for Unix- and Microsoft Corp. MS-DOS-based systems.

Unisys has been marketing PDS-Adept to overseas users of equipment from the former Burroughs Corp. since last summer, the company added.

Early this month, Unisys introduced Ally, a fourth-generation language development and execution system that was designed for Unix- and MS-DOS-based systems. Ally does not run on B25 hardware, a company spokeswoman said.

Unisys said it will offer interface programs for PDS-Adept that will let programs developed in one environment, such as Unix, run in another PDS-Adept environment, such as BTOS.

PDS-Adept will cost $1,890 for a BTOS license, $2,600 for a Unix license and $595 for an MS-DOS license, Unisys said.

Currently, a program generator called Data Manager is available for BTOS-based systems. A spokeswoman said the generator is not sophisticated enough to be considered a fourth-generation language product.

MCBA adds to MRP II for the VAX

GLENDALE, Calif. — MCBA, Inc. recently added four modules to its Manufacturing Resource Planning (MRP II) system for the Digital Equipment Corp. VAX.

The latest release includes the core MRP II module, the company said. MRP II software is used to control the components used in manufacturing and when they are used, based on the company's production schedule. The introduction of MCBA's MRP II module comes after the introduction of a number of other modules earlier this year.

MCBA's manufacturing software is intended for repetitive manufacturers and jobs shops. The packages, which range in price from $2,500 to $12,000, are available immediately, the vendor said.

In addition to the core package, MCBA released the Master Scheduling module, which, when used in conjunction with the MRP II module, provides a detailed master production schedule and allows users to perform "what-if" scheduling based on expected demand, the company said.

MCBA also rolled out a Job Costing package. It is said to al-

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Inside

- Sun to offer third-party CAD/CAM system on Sun-3, Sun-4. Page 26.
- Macro 4 adds VTAM session-management tool. Page 31.

Ada

FROM PAGE 1

where program managers seek waivers to avoid using it.

Ada is the DOD's standard language for use in embedded systems such as jet fighter navigation systems, but so many DOD program managers have obtained waivers to use other languages that this past spring, the Pentagon established stringent new rules to make it virtually impossible to get a waiver.

Dooming civvies

Ada has progressed so slowly in the military environment that some observers say its real future lies in commercial MIS and factory automation markets.

"I predict that by 1990 the commercial use of Ada will far exceed military use of Ada, even in the U.S.," says Edward V. Berard, president of EVB Software Engineering, Inc., an Ada software and consulting firm in Frederick, Md.

Analysts warn that it is too early to call Ada a failure. Years ago, many computer scientists thought Ada would never get off the ground, but Ada is now in use in 37 military systems, and there are about 120 Ada compilers covering virtually all processors, including personal computers.

In addition, Ada is expected to be used in such high-profile projects as the Pentagon's Strategic Defense Initiative, the National Aeronautics and Space Administration's space station program and the Federal Aviation Administration's new air traffic control system.

The kind of systems that employ Ada can take eight years or more to build, so it is hard to gauge Ada's success in operation. "I think it's a little early to judge the overall efficacy of the language. The results aren't in," says William Suydam, editor of the "Ada Data" newsletter, published by International Resource Development, Inc. in Norwalk, Conn.

But Suydam says Ada will never reach the high expectations of its early backers. "The Ada old-timers really thought the language was going to make all the difference in the world, as if it was magic. It's not magic. It's a computer language, a very complex computer language," he says.

The DOD developed Ada and its software engineering environment in the 1970s in hopes of curtailing the proliferation of special-purpose languages and cutting its skyrocketing costs for software development and maintenance.

The resulting language, widely regarded as elegant and complex, is touted as being portable, readable, easily maintainable, reliable, adept at parallel processing and modular, so that packages or blocks of code can be reused.

On the other hand, critics say Ada is intrinsically unsuited for embedded systems and real-time processing because it produces code that is too bulky and slow. In response, Pentagon officials point to several systems, including the F-20 Tigershark fighter plane, that have demonstrated Ada's successful use in real-time applications.

Directive issued

In June 1983 the Pentagon issued a directive that made Ada the standard computer programming language for mission-critical systems, but by most accounts, the directive was not strictly enforced.

"The DOD seems to be able simultaneously to commit to Ada and to avoid using it in actual applications," says Kenneth G. Bosomworth, president of International Resource Development, a market research firm.

Originally, the DOD allowed program managers to get waivers from the Ada mandate if they had already started using another language. But Bosomworth says that in the last few years there has been a tendency to find excuses to avoid using Ada and that the excuses have gotten less and less plausible.

So many waivers to the directive were granted that on April 2 the Pentagon issued DOD Directive 3405.1 with stringent provisions intended to make it extremely difficult to get a waiver.

"Ada is, in fact, being rammed down their throats," Bosomworth says, referring to the top-down imposition of the language.

Analysts say mid-level program managers in the DOD resisted Ada for a variety of reasons, including the fear that using an unproven language would increase the risk of their projects going over budget or behind schedule.

For one thing, the Ada language system is a drastic departure from the life-cycle software development methodology that DOD managers have become accustomed to using. "Ada takes a good many shortcuts through this life-cycle software development path," says Andrew J. Ventre, president of Computrol Corp., a software engineering firm in Huntsville, Ala.

"It's not just a decision about whether to use a new language but a decision to embrace a new philosophy of software development," Ventre says.

In addition, mid-level DOD managers have complained about the lack of production-quality Ada compilers. Although compilers must be run through a suite of some 2,500 tests to ensure they meet the Ada standard, the validation tests do not evaluate performance quality.

Compiler quality

At the moment, some Ada compilers are slow but produce high-quality code, while others are very robust but produce low-quality code, a compiler expert says. "There aren't very many compilers at all that have combined usability and code quality," says Tucker Taft, technical director at Intermetrics, Inc., a Cambridge, Mass.-based systems software house with military contracts.

Taft and other analysts say the problem with code quality is not inherent with Ada but that better optimizing compilers will require a huge financial investment by the Pentagon.

While there are probably no bug-free compilers, the Ada compilers are improving. "We're entering the age of production-quality compilers in Ada," Suydam declares. "Right now, I'd say you can buy really good compilers for [Digital Equipment Corp.'s] VAX," he adds.

Suydam predicts that Directive 3405.1, which firmly establishes Ada as the standard language for all weapons systems, will produce a turnaround in the military's resistance to Ada. "I see people suddenly taking Ada more seriously now," he says, reflecting the view of other observers.

Furthermore, the DOD's Ada Joint Program Office (AJPO) is taking some steps to improve Ada's fortunes:

- The AJPO has issued a contract to develop tests that evaluate the performance of Ada compilers in specific applications.
- An AJPO task force is developing minor revisions to the Ada standard, for implementation in the 1990s, to ensure that it works as effectively as possible.
- In September the DOD will begin to dole out about $20 million in research contracts for Ada development tools.
- In a crackdown on "counterfeit" compilers — those that falsely claim to be validated by the AJPO — the office is issuing certification stickers to vendors of validated Ada compilers.

The DOD also issued a directive this year requiring the military services to use Ada for all new data processing systems, such as accounting and payroll systems.

Suydam says DP systems have the same need to save on design and maintenance costs as embedded systems. "The difference is that Ada technology is really much further along for the data processing people," because today's compilers are good enough for traditional data processing tasks, he adds.

But cracking the commercial MIS world will be no easy task for Ada, mostly because Cobol is entrenched there.

"Unlike the European banking community, U.S. financial MIS shops are firmly attached to Cobol, which shows no signs of conveniently disappearing," IDC's Burris says. "Unless IBM leads the way, no U.S. bank will board the Ada train."

Burris says Ada is most likely to be used in process-control applications requiring heavy real-time processing, such as those in the oil industry, manufacturing and commercial avionics.

Commercial applications

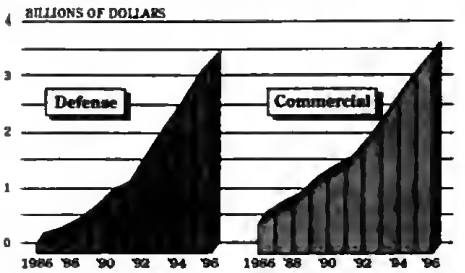
Already the Commercial Ada Users Working Group has identified several commercial applications of Ada, including major banks in Finland, a seismic data program at Shell Oil Co., the development of a new airplane by Boeing Commercial Airplane Co. and a stock quote service at Reuters Ltd.

The users group, formed in July 1986, aims to provide accurate information to help corporate managers make decisions about Ada as well as encourage vendors to provide products that meet the needs of commercial users, according to David M. Dikel, chairman of the group and director of Washington, D.C., operations for Addamax Corp. in Tysons Corner, Va. The group is part of the Association of Computing Machinery's Special Interest Group on Ada (Sigada).

"Remember that Cobol was developed by the DOD," consultant Ventre says. "To the best of my knowledge, Cobol is not used in any embedded system, but it is the most widely used programming language for business. Maybe Ada, if there's any success in its future, will be used more in the commercial environment than in the military environment."

Prospects for Ada

Ada markets are not likely to take off until the mid-1990s



INFORMATION PROVIDED BY INTERNATIONAL RESOURCE DEVELOPMENT, INC.
CW CHART

Ada milestones

1974 to 1976 — Department of Defense officials discussed adoption of a common programming language. DOD formed the High-Order Language Working Group to develop the specifications.

1977 to 1979 — DOD held a design competition for a language to meet the specifications. Competition won by the CII-Honeywell, Inc.-Compagnie des Machines Bull team, led by Jean Ichbiah of France. Language named "Ada" after Lady Augusta Ada Byron (1815-1852), considered to be the first programmer.

1980 — Ada design finished and published as a military standard (MIL-STD-1815). DOD's Ada Joint Program Office formed.

1983 to 1984 — Ada became an American National Standards Institute standard (ANSI/MIL-STD-1815A-1983). DOD Directive 5000.31 made Ada the standard language for DOD mission-critical systems.

1985 — Ada selected for use in NASA's space station program and the FAA's new air traffic control system. Ada cited as a Federal Information Processing Standard.

March to April, 1987 — International Standards Organization adopts Ada as a standard. DOD Directives 3405.1 and 3405.2 require the use of Ada for all new weapons systems and DOD data processing systems.

CW CHART: MITCHELL J. HAYES

What will be Ada's legacy?

Researchers predict that the Ada market will take off sometime in the mid-1990s. But by then, Ada may be an outdated language, overtaken by new developments in software engineering or replaced by a new language, according to several Ada observers.

"It is entirely possible that by the time the Department of Defense finally gets around to implementing Ada . . . it will be a prior-generation language," says Ken Bosomworth, president of International Resource Development, Inc.

Given the history of computer languages, Bosomworth says, it is very possible that in about 1995, the DOD will initiate development of a new "Son of Ada" language.

Moreover, while the DOD strictly regulates Ada's development, the next five years will give rise to new computer-aided software engineering (CASE) technologies for more established computer languages. "These developments could obviate the commercial, and perhaps even the military, need for Ada," says Peter Burris, an analyst at International Data Corp. "The Ada train may ultimately arrive in Edsel land."

Ada is remarkable for the fact that software engineering played a central role in its development, Burris acknowledges. "There was so much excitement about Ada . . . but it's still 1970s technology, and it's still controlled by the DOD, which means it will be slow to change," he says.

Edward Berard, president of EVB Software Engineering, Inc. in Frederick, Md., argues that Ada will not be replaced by new software engineering technology but will accelerate those developments. For example, he says, CASE packages will be more useful if they are written in Ada, a portable language with reusable blocks of code. "Ada's a tool kit. It was created because we have all this good, modern software engineering technology and we need a language to deliver it," he adds.

William Suydam, editor of the "Ada Data" newsletter, asserts that Ada is a clear improvement in software engineering over C and Fortran and may prove more adaptable than its critics suggest. However, he adds, "I personally doubt that 25 to 35 years from now, Ada will be the language of choice — it may be something derived from Ada."

Ada may have a small role in MIS software development centers of the future, particularly for parallel processing systems, just as LISP had a role in developing commercial expert systems, according to Gig Graham, software program director at the Gartner Group, Inc., a research firm in Stamford, Conn.

"Ada provides a glimpse of the future," Graham says. "Existing languages will evolve, not as elegantly but nearly as effectively, to do what Ada demonstrates can be done."

MITCH BETTS

Cullinet ships CASE tool geared to data base design

WESTWOOD, Mass. — Cullinet Software, Inc. last week began shipping the latest version of its computer-aided software engineering (CASE) tool and said that the next release of the CASE product will be out in October.

Version 3.0 of Auto-Mate Plus, a personal computer-based package intended for the development of mainframe systems, includes features for data base design, the company said.

Auto-Mate Plus was originally designed by Learmonth Burchett Management Systems, Inc. in London. Cullinet acquired rights to the source code last year and has since been working to bring it into the Cullinet IDMS/R data base management system fold. With the October release, the product reportedly will be renamed IDMS/Architect. That release will be more fully integrated with the Cullinet DBMS, the company said.

Version 3.0 is said to allow users to automatically create a physical data base design. It can then generate a Bachman Schema Diagram from its physical data base structure.

The Bachman Schema Diagram is used by data base designers to determine where the data is located in a data base.

It is named after Charles Bachman, one of the original developers of IDMS, which Cullinet acquired from B. F. Goodrich Co. in 1973.

From the Bachman diagram, the system generates an IDMS/R data definition language syntax that can be used to describe what the data base will look like, Cullinet said.

The company said the latest version includes a text transfer utility that uploads schema syntax to the mainframe.

Version 3.0, which runs on IBM Personal Computer AT-class machines, has a license fee of $8,000. The previous release, Auto-Mate Plus Version 2.5, also costs $8,000 and was introduced in April.

Users can upgrade based on their maintenance agreement with Cullinet. For example, a single-unit renewal fee is 12% of the total cost under some contracts, the company said.

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Tactic

CONTINUED FROM PAGE 21

volved in the establishment of a corporate information center. The center's system ran under IBM's VM/SP operating system and included IBM's ADRS, ADRS/Business Graphics, APL and APL Data Interface (a bridge to get information from APL or DOS/VSE into ADRS). The basic data was stored under IBM's DOS/VSE within the DL/1 data base system.

Aim of center

The purpose of the information center was to allow management to access frequently requested data and to manipulate data with the relational tools supplied by this IBM information center software.

BECAUSE OF THE state of our current technology, many organizations are implementing "relational-like" data base systems or extracting data from conventional DBMSs and importing limited amounts of the data into relational facilities.

The theory behind this approach is to reduce the programming burden on information services and to improve service to the users. After installation, it was soon apparent that the programming burden was not decreased and may have increased as a result of various types of extraction programs necessary to copy the data from DL/1 into a form usable by ADRS. The integrity of the data suffered at times. It was now a manual effort to ensure the following:

- The appropriate extraction program was run successfully.
- The DOS/VSE work file created by the extraction program was successfully copied into ADRS.

It was quite possible for the extract program to abend, leaving a partial file to be imported into ADRS.

Keeping integrity intact

I believe that whenever integrity is removed from the controlling software, problems will occur. While the data resided in DL/1, the integrity could be assured because of the software control.

However, the work file used as a bridge between DL/1 and ADRS has no built-in control and is at the mercy of the programmer and computer operator.

To a limited degree, security became a problem. Security facilities built into DL/1 and CICS do not apply to the ADRS work spaces. Separate security facilities under VM must be used, thus requiring a dual effort from those technical personnel responsible.

No room at the disk?

Disk space was a major concern. If large amounts of data were extracted from DL/1, then large amounts of disk space were required for the DOS/VSE work file, APL Data Interface file and ADRS work space.

When extracting limited data in a manner similar to that described, it is necessary for all users to fully understand that modifications to the data residing in their own relations will not be reflected in the DBMS that originally stored the data. The bridge from the original DBMS is a one-way connection in most cases.

Data imported into a relation from an extract program must be data that is not dynamic in nature. On-line modifications to the original DBMS from on-line facilities such as CICS will not be restricted in the relations. If the changes are to be incorporated into the relational-like data base system, then the entire load procedure must be repeated.

What I feel is needed is a true relational DBMS capable of supporting massive processing. Until it is clear that relational systems can provide this, a wait-and-see approach is needed on data base replacement decisions. And relational-like systems will only serve the needs of users for a short time.

O'Connell is assistant professor of computer science at the State University of New York at Fredonia and a consultant.

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MCBA

CONTINUED FROM PAGE 21

low users to keep track of costs of a job, including parts and labor. Users are able to compare actual costs with what they had predicted, which can be a method of detecting problem areas if differences show up between real and expected costs, the company said.

Finally, MCBA introduced a Standard Product Routing program that is used to provide a trace of all the operations, tools and processes used to make a particular product. Data from this module can be incorporated in bills of labor, MCBA added.

The MRP core package ranges in price from $6,000 to $12,000, depending on the DEC hardware. Master Scheduling starts at $4,500. Entry price for Job Costing is $4,000, and the low-end price of Standard Product Routing is $2,500.

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Costs

CONTINUED FROM PAGE 21

cost issues and asked for the vendors' plans regarding discounting and concessions to customers. Respondents came from the mainframe, minicomputer and microcomputer software markets and included such companies as Cincom Systems, Inc., Software AG of North America, Inc., Relational Technology, Inc., VM Software, Inc. and SPSS, Inc.

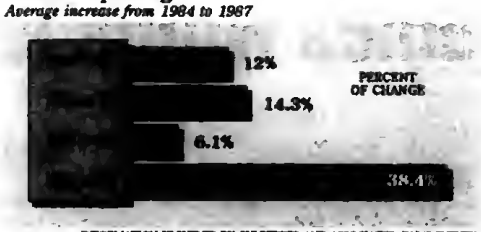
Based on the software companies' responses, users have paid an average annual increase of 8.4% for software products since 1983, showing a 38.4% increase in a three-year span.

Further, vendors reported that they expect to increase prices by an average of 6.1% by the end of this year. But Culpepper noted that earlier surveys showed that the predicted increases supplied by vendors are conservative and said this year's increase is expected to top 6.1%.

Users who made purchases in the system control and development category — operating systems, programming languages, data bases and applications generators — experienced a much steeper increase than average. Since 1983, the average price increase for these products has more than doubled. The average cost of system control and development products this year is $65,700, a 63.5% increase from 1983, the survey found.

Software pricing

Average increase from 1984 to 1987



INFORMATION PROVIDED BY CULPEPPER AND ASSOCIATES, INC.'S SURVEY OF 117 VENDORS

Meanwhile, the smallest increase occurred in the cross-industry systems category, which covers applications software — such as general ledger, decision support, human resources and word processing — used in a variety of industries. Since 1983, these prices have increased an average of 25.6%. This year, the average purchase price for cross-industry applications is $79,600.

Actually, vendors from the integrated systems category, made up of value-added resellers, reported only a 4% increase in prices during the last three years. However, that reflects, in part, the lower costs of hardware, Culpepper reported.

Across-the-board hikes

The three remaining categories — microcomputer software, vertical market software and system operation and utility software — all showed substantial increases, with micro software coming in above the overall average increase at 49.7%.

System operation and utility software was also higher than average at 44.5%, while vertical market software showed a smaller increase of 27.1%.

Beyond price increases, vendors reported increases in maintenance and support charges. They said the average annual maintenance charge was almost 15% of a total license fee, up from 12.2% in 1983.

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Sun markets CAD/CAE tool

MOUNTAIN VIEW, Calif. — Sun Microsystems, Inc. said recently it will offer a computer-aided design and engineering (CAD/CAE) system from The MacNeal-Schwendler Corp. on Sun-3 and Sun-4 computers.

Under the agreement, Los Angeles-based MacNeal-Schwendler's MSC/Nastran finite-element software will become one of the third-party CAD/CAE products Sun offers for its line of technical workstations.

The large-scale, general-purpose digital computer program reportedly will be designed to take advantage of the advanced floating-point performance of the Sun-4 and will offer up to 128M bytes of memory.

Finite-element use

MSC/Nastran is used by designers and engineers to test the strength and dynamic response of structures and products. Using the finite-element method, the program analyzes material and geometric nonlinearity, heat transfer, acoustics and electromagnetism.

MacNeal-Schwendler currently sells the package on a variety of high-performance computers from companies such as Cray Research, Inc., IBM, Digital Equipment Corp. and Apollo Computer, Inc.

Applications include problem solving in the automotive, aerospace and heavy manufacturing industries.

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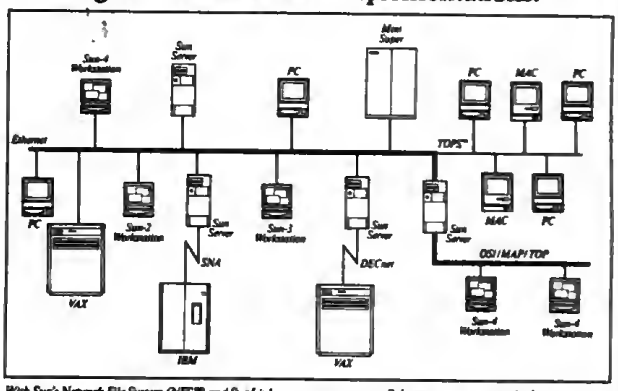

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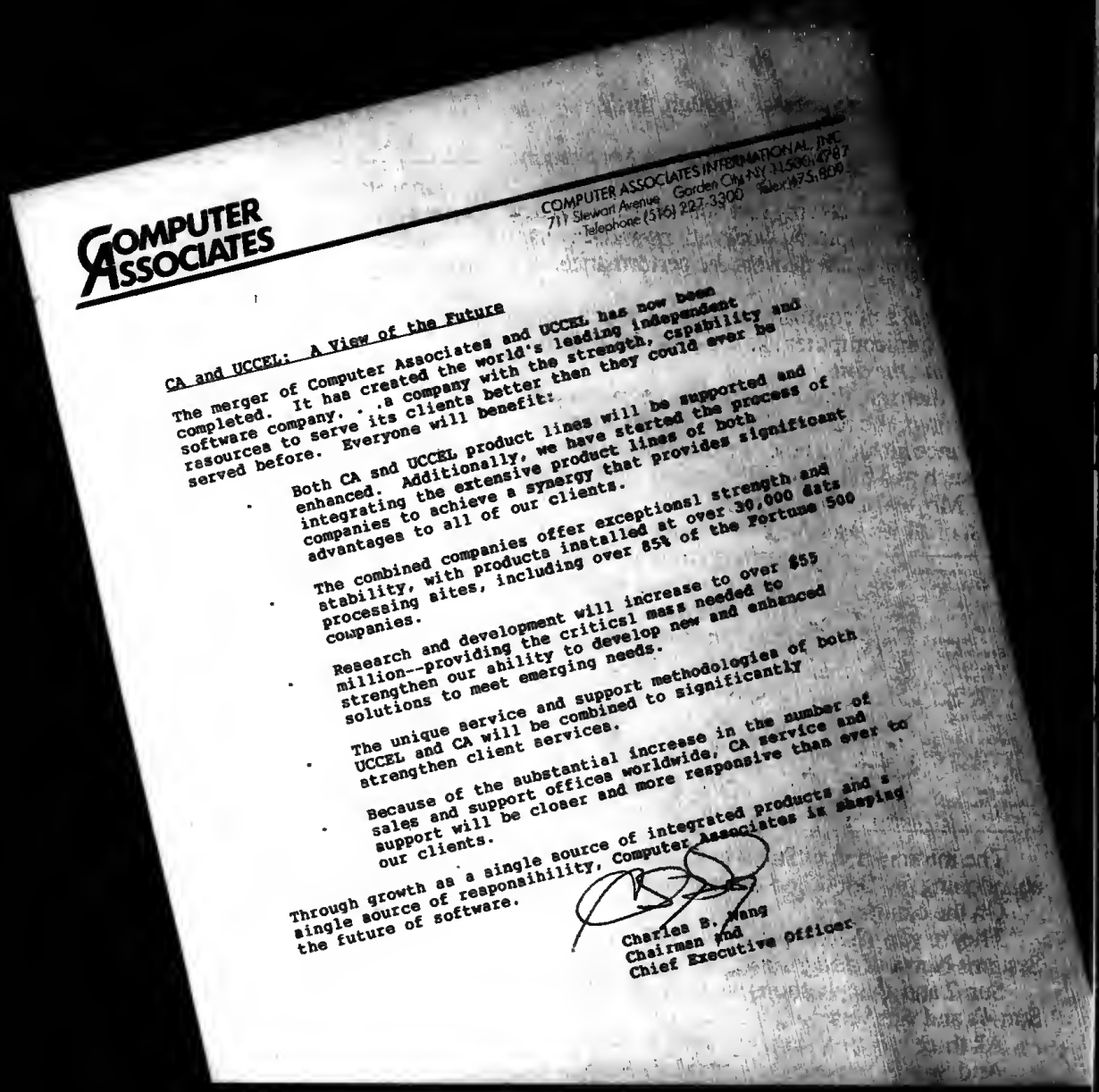

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NEW PRODUCTS

Systems software

Software designed to provide IBM VTAM session management in multiple on-line environments has been announced by **Macro 4, Inc.**

Tubes/VTAM is said to provide all logged-on users with s means of accessing all applications needed in s VTAM environment. Each Tubes/VTAM user may be allowed concurrent access of up to 24 applications.

Tubes/VTAM can be configured to automatically pass input to an application when the session with it is initiated or going to be terminated.

Tubes/VTAM is available on a one- or two-year lease for from $400 per month.

Macro 4, Brookside Plaza, Mount Freedom, N.J. 07970.

Applications packages

A user-defined electronic resource management scheduling calender has been announced by **Cradle Technologies** for use on IBM's System/36 and Personal Computer and compatibles.

The Scheduler, written under an open architecture philosophy, allows the user to schedule people or items in s variety of increments. Schedule conflicts are highlighted, the vendor said, and scheduling periods can extend to the year 2100.

The Scheduler/36 costs $239. The Scheduler/PC costs $119.

Cradle Technologies, 12266 W. Holt Ave., Milwaukee, Wis. 53227.

Languages

A compiler for IBM's System/36 assembly language, the **Ressemble/36**, has been announced by **Kisco Information Systems**.

Ressemble/36 provides access to all privileged superior areas in main memory and on disk, including the print spool, job queue and the list of active users and jobs.

The compiler includes s subroutine library with standard routines to access tape and diskette devices. Assembler source code for all subroutines is also provided.

Ressemble/36 is available for a one-time license fee of $600.

Kisco Information Systems, 120 Beverly Road, Mount Kisco, N.Y. 10549.

Utilities

An enhanced version of **Costar**, an interactive software cost-estimation tool based on the Constructive Cost Model, has been announced by **Softstar Systems**.

Version 1.21 runs on any Digital Equipment Corp. VAX/VMS system or IBM Personal Computer.

It is said to allow users to make preliminary estimates during a project's initial definition, then produce more and more accurate forecasts as the project's definition is refined.

The VMS version of Costar costs $1,500. The PC version costs $800.

Softstar Systems, 28 Ponemah Road, Amherst, N.H. 03031.

Development tools

Goal Systems International, Inc. has added two options to its Classical/AL on-line applications development system.

The **Classical/AL DL/1 Access** and **Classical/AL IMS Access** offer programmers high-level access to DL/1 and IMS hierarchical data base management systems.

According to the vendor, the options allow users with little knowledge of data base structure to access DL/1 and IMS with the same verbs and framework used to access IBM's VSAM.

The Classical/AL DL/1 and IMS options cost $5,000 for DOS and IBM's VSE. The Classical/AL system costs $35,000 for DOS/VSE and $44,800 for IBM's OS/MVS.

Goal Systems, 5455 N. High St., Columbus, Ohio 43214.

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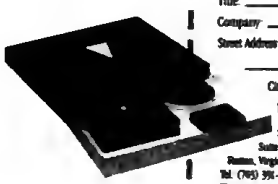

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SMALL TALK

William Zachmann

The price is right

Once I lived next door to a large, quietly elegant house owned by an older gentleman who had graduated from Harvard University in the 1930s. I remember him commenting once that he preferred not to shop at Brooks Brothers. "I simply see no reason," he said, "to pay $12 for a shirt and then another $12 for the label."

That seemed as sensible then as it does now. It also goes a long way toward explaining why I welcome products like Dell Computer Corp.'s PC's Limited 386-16. Here is a quality-built, high-performance personal computer based on a 16-MHz 32-bit Intel Corp. 80386 microprocessor at a price that carriage trade brands charge for 12- or even 10-MHz Intel 80286-based systems.

But for some reason, Dell's press materials concentrate on the PC's Limited 386's list prices relative to competitive 386-based products like Compaq Computer Corp.'s Deskpro 386 (about $2,000 more than the PC's Limited product) and

Continued on page 36

PS/2 models in competition

BY JAMES A. MARTIN
CW STAFF

The advent of multifunction boards for IBM's Personal System/2s may make IBM's low-end PS/2 Model 50 machine a potential competitor to the more expensive Model 60 for single-user applications, users and board makers said recently.

The add-ins may also sidetrack IBM's intent to gear the Models 50 and 60 toward separate, distinct markets.

The differences between the basic configurations of the models are hard-disk capacity, memory expansion limits, the number of expansion slots and at least $1,700.

However, using expansion boards that are set to become available this year, users can erase all but the expansion slot disparities, turning a Model 50 into a Model 60 for several hundred dollars less, vendors said.

While IBM claimed the Model 60's random-access memory (RAM) can be expanded to 15M bytes while the Model 50 is limited to 7M bytes, board makers said that is not so.

Cumulus Corp., a start-up company in Cleveland, recently introduced a multifunction card that is capable of adding up to 8M bytes to the Models 50 and

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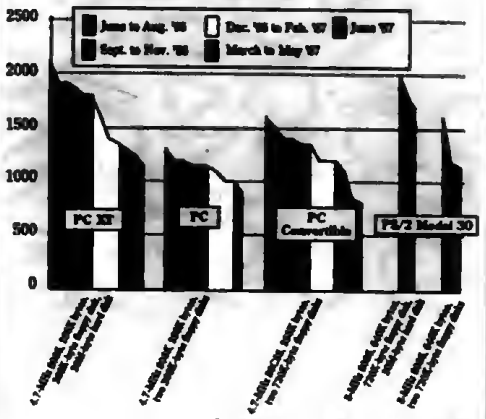
Inside

- Owl International plans an upgrade that allows its Microsoft MS-DOS-based Guide to read files from Apple's Hypercard. Page 38.
- Psion, Inc. introduces a hand-held computer that provides desktop PC features. Page 39.

Data View

Retailers' discounted microcomputer prices

Prices for Intel Corp. 8088- and 8086-based IBM Personal Computer and Personal System/2 families



INFORMATION PROVIDED BY WORK ASSOCIATES
CW CHART

Ex-software evangelist peels back Apple's skin

Apple Computer, Inc.'s ebullient "software evangelist" Guy Kawasaki resigned from the company in April, after helping create a third-party software industry responsible for an installed base of some 2,500 Apple Macintosh programs.

Acius's Kawasaki

As founder and president of Acius, Inc., Kawasaki is now a third-party developer for the Macintosh, the very product he nurtured as director of product software management at Apple.

Kawasaki recently spoke with *Computerworld* West Coast correspondent Julie Pitta about Apple's evolution and challenges and about his new baby, Acius, which recently began shipping 4th Dimension, a relational data base manager.

How does Apple develop software without risking its relationship with third parties?

It cannot, and that's why Claris [Apple's independent software company] is a good thing. Anytime Apple does any software, it risks its relationship with its developers. It's just much better that Claris publishes it than anyone else.

Describe Acius's first product, 4th Dimension.

4th Dimension is a high-end relational data base for the Macintosh. The keys to it all are that it has a programming language in it: an [Apple] Macdraw-like, object-oriented graphics editor.

It's an open-architecture data base in the sense that you can write routines in other languages and import them into 4th Dimension. In addition, it's a multiuser data base, and we will

Continued on page 38

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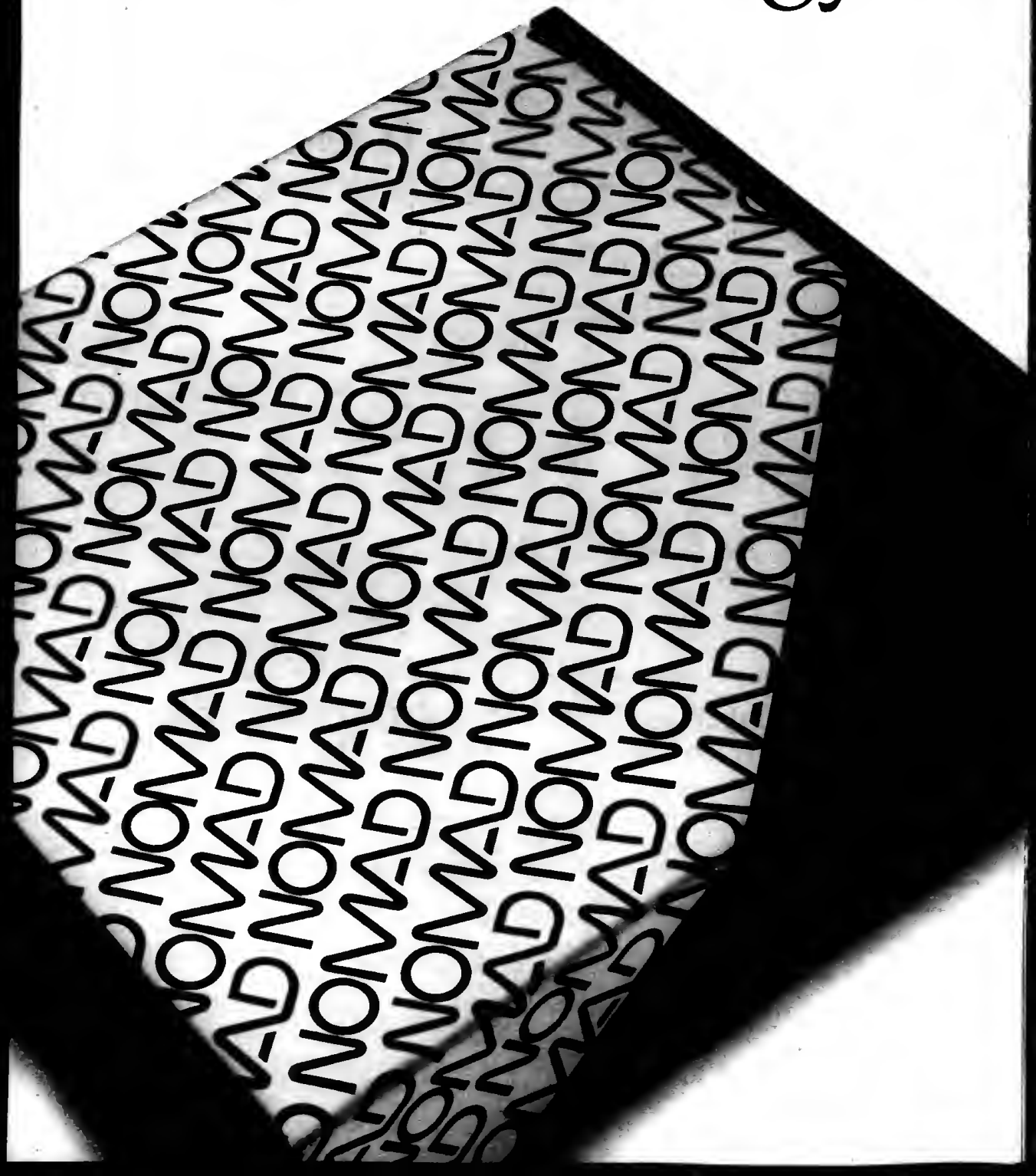

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Models

CONTINUED FROM PAGE 33

60. The Model 50 could support two Cumulus cards, totaling 17M bytes of memory, President Martin Alpert said.

"The reason IBM said 7M bytes is the maximum is because they only offer a 2M-byte card and the machine has only three slots, so for an IBM solution, the ceiling would be 7M bytes," Alpert said.

Engineers st Quadram Corp. in Norcross, Ga., have also run 16M bytes of RAM on the Model 50, said Clint Cowan, PS/2 product manager. "Our engineers say it can be done, so we're designing enhancement products that can add a total of 16M bytes on both machines," he said.

Although the Model 50 and 60 share many features, the Model 50 has only three expansion slots, compared with the Model 60's seven slots. In addition, the Model 50 is equipped with only a 20M-byte hard disk drive. The Model 60 is available in 44M- and 70M-byte hard-disk configurations with access times roughly half that of the Model 50's drive.

"The major shortcoming of the Model 50 is the hard-disk capacity," said Norm De Witt, a microcomputer analyst for Dataquest, Inc. in San Jose, Calif.

"The biggest criticism I have of the Model 50 is the 20M-byte hard disk," said John Robinson, manager of corporate information systems for Cox Enterprises, Inc. "But the Model 50 is small, and, in most cases, the three slots are enough."

In the hard-disk arena, Plus Development Corp. in Milpitas, Calif., is expected to release a version of its Hardcard storage expansion board for IBM's Micro Channel in three to nine months.

But there are disadvantage to adding higher capacity hard disks and other features to a Model 50 in hopes of constructing a lower cost Model 60. The Model 50's retail price is $3,595 but is often discounted by $1,000. The 44M-byte Model 60 retails for $5,295 and often sells for $4,250, while the 70M-byte version retails for $6,295 and can be purchased for around $5,000 in some markets.

A Plus Development Hardcard retails for $795 but can be purchased for between $500 and $600. Memory expansion cards run from $300 to $1,000.

Price

CONTINUED FROM PAGE 33

IBM's Personal System/2 Model 80 (about $3,000 more). Having spent several weeks putting this PC through its paces, there isn't much doubt where I'd prefer to put my money.

The PC's Limited 386 is a zero- to one-wait state system using static random-access memory (RAM) instead of the more common dynamic RAM, which is used in products like IBM's. Static RAM does not require periodic refresh signals like those that interrupt even block data transfers on the PS/2's Micro Channel architecture.

The PC's Limited 386's performance with comparable software should equal or exceed that of the PS/2 Model 80-041 and Model 80-071 at a price below that of the much slower 286-based Model 60. The PC's Limited 386 racks up an impressive 18.4 performance index relative to an IBM Personal Computer XT on the Norton index.

The base configuration of the PC's Limited 386 includes 1M byte of static RAM, a 1.2M-byte floppy disk drive, two serial ports, one parallel port, a new IBM-style enhanced 101-key keyboard and seven slots (five available).

Configurations range from a monochrome system (including display and adapter) with a 28-msec average access time 41M-byte hard drive for $4,499 to an IBM Enhanced Graphics Adapter (EGA) system with an 18-msec 150M-byte hard drive, which lists for $6,499. The EGA system with a 28-msec 70M-byte hard drive that I've tested lists for $5,399. By comparison, a PS/2 Model 60 with a 10-MHz 286 microprocessor and a 40M-byte 40-msec hard drive lists for exactly $104 less without a monitor.

"Let's Make a Deal"

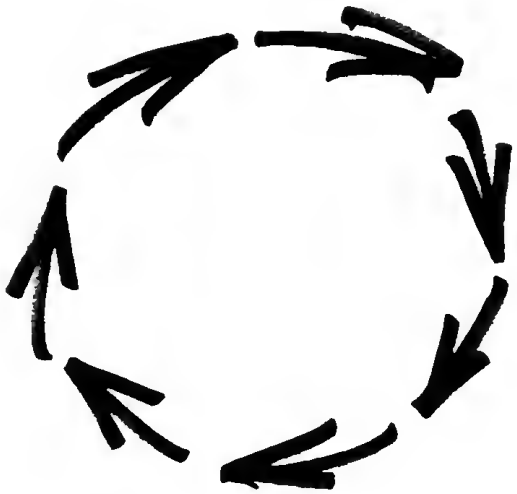
You can, of course, get substantial discounts from IBM's list price, but corporate buyers interested in quantity can play "Let's Make a Deal" with Dell just as easily as they can with IBM or with any other vendor that is serious about competing in the PC market.

The evaluation unit I tested had some problems with a bad backup battery. I deliberately bypassed Dell's public relations people and, working through Dell's technical support, had no trouble getting a replacement. Their support was certainly better than what I have received from larger, better known vendors.

In addition, I found that while my Microsoft Corp. MS OS/2 prerelease version built for the IBM PC AT seems to work all right in protected mode on the PC's Limited 386, there seems to be a problem running real-mode Microsoft MS-DOS 3.0 and higher emulation. I suspect there may be a conflict between MS OS/2 and the built-in (in read-only memory) system setup routine in the PC's Limited 386. The Dell folks in Austin, Texas, assure me, however, that they will offer a licensed version of MS OS/2 Standard Edition.

While the PC's Limited 386 may not appeal to the carriage trade buyer the way better known brands do, for people like my former neighbor and me, it's a great way to concentrate on the shirt and avoid paying for the label.

Zachmann is vice-president of research at International Data Corp.



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Owl version to offer read access to Hypercard files

BY ALAN J. RYAN
CW STAFF

BELLEVUE, Wash. — By year'a end, Owl International, Inc. plans to release a new version of its Microsoft Corp. MS-DOS-based Guide hypertext program that will allow MS-DOS Guide to read files from Apple Computer, Inc.'a new Hypercard.

Guide is a hypertext system for both the Macintosh and the IBM Personal Computer that is similar to Apple's Hypercard, a package that allows users to integrate text, graphics and video.

With Guide, users can manage text and graphics through electronic documents and live areas on the screen called buttons.

Users can organize information graphically, and Guide files can be accessed while the computer is running another program.

The yet-to-be-introduced enhanced version of Guide for MS-DOS, codenamed William Tell, will include a hook that will allow Guide to read Hypercard, according to Barb Landis, Owl International's sales manager.

"But we're not promising that [version] until toward the end of the year," she said. The current version for MS-DOS sells for $199, and the Macintosh version sells for $134.

Additionally, the upgrade will include a serial hook that will allow Guide to interface with any external device that can be attached through a serial port, Landis added.

While Apple'a Hypercard requires 1M byte of random-access memory (RAM), the Owl hypertext offerings require only 100K bytes of RAM.

The upgraded version will feature a fourth command button that will reportedly allow users to create links between Guide files and files in other programs. For instance, Landis explained, a user could click on a name in Guide and have it go to a Windows spreadsheet application. "The user can jump from program to program," and Guide will return to the point of departure from the other program, she said.

Out since fall

The original version of Guide for the Macintosh was introduced last fall, Landis said. In June, Owl released a version of the program for the IBM PC AT and Personal System/2 that sells for $199.95.

Steven Erde, a physician and a technical director at Cornell University's Medical School, is currently working with Guide for the Macintosh. The medical school was also a beta-test site for Hypercard.

With Guide, Erde said Cornell will be teaching medical school classes, in part, through the computer. The information learned by students in the first and second years of classes is being put on-line, so a student can sit at the Macintosh and read his way through lectures.

At any point, the student can click onto another portion of the information to get into a separate lesson. For instance, a student reading a lesson about the pathologic process can click to get a picture of the tumor or click to an explanation of the drugs used for treatment, Erde explained.

The Hypercard and Guide programs, Erde said, are very similar in function, but "the roots of the two programs are different." Guide uses hypertext, which he equated to a large mass with multiple connections of text and information.

Ex-evangelist

CONTINUED FROM PAGE 33

sell runtimes so that someone doesn't have to own the entire data base; you can buy a much cheaper runtime version.
We, in a sense, are entrenched in the Mac, while Ashton-Tate and other MS-DOS companies are just coming into it. It'a David vs. Goliath, the Afghans vs. the Russians, the ability of a teen-ager to land in Red Square.

What will be the impact of Apple'a Hypercard and Multifinder?

Multifinder is more important than Hypercard. Multifinder will change people's lives.

The ability to do multitasking on the Macintosh has been needed.

Hypercard is a good thing. It reinforces the belief that Mac users are in control of their personal computer while IBM PC users are controlled by theirs.

How has Apple changed?

Today'a Apple is more process- and consensus-oriented than when I was there, which is a good thing. Previously, Apple was either very wrong or very right. Now it's much more controlled and analytical.

What is Apple'a greatest challenge?

The greatest challenge that Apple faces is productizing their gadgets, which right now are Mac IIs, Mac SEs and Laserwriters. Now you need connectivity, data interchange, service and support. It's building a cocoon around what was once just great personal, stand-alone hardware.

What will it take for Apple to break into corporate America?

They're already there. It's a done deal. They're selling somewhere between 50,000 and 60,000 Macs a month. They're not going home to keep track of recipes.

But corporate America, in terms of the Fortune 500, is still a Big Blue world?

It'a fraying around the edges. The announcement, but not the shipment, of the OS/2, and the fictionalization of OS/2 support by software developers, is a very big contributing factor. It'a kind of ironic that in 1987, IBM's pushing ease of use and Apple'a pushing power, when in 1984, Apple was pushing ease of use and IBM was pushing power.

What'a the most important thing you learned at Apple?

I learned how important relationships are with third-party developers. That is what made Macintosh. That's something that I've tried to bring with me to Acius.

Another thing is what I learned about breaking rules. We had a saying that it's better to ask for forgiveness than permission. I epitomized that.

What'a the biggest rule you broke at Apple?

Once I made a commitment for three-quarters of a million dollars to various developers, in total. I had a signature authority of $5,000. The finance person at the Mac division wanted to have me fired.

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NEW PRODUCTS

Systems

A handheld computer said to provide all the features of a desktop personal computer has been announced by **Psion, Inc.**

The **Organiser II** features up to 320K bytes of on-board memory, built-in software, plug-in program packs, solid-state drives for storing information and loading programs, plug-in peripherals and links to office-bound systems.

According to the vendor, the Organiser II offers a calculator with 12-digit accuracy, 10 memories and full mathematical and scientific functions. It has a built-in clock/calendar that monitors and controls diary and alarm functions and a programming language that allows programs to be written and stored either in memory or on a program pack.

The Organiser II is priced from $159.95.

Psion, 320 Sylvan Lake Road, Watertown, Conn. 06795.

Software utilities

A menuing and file-management system that provides access to applications on IBM Personal Computer XTs, PC ATs and compatibles has been introduced by **Design Software, Inc.**

Called **DS Manager**, the non-memory-resident program creates a single environment in which users can select various applications from a main menu. The software also offers Microsoft Corp. MS-DOS function capabilities. Other features include file searching, a statistics capability, a menu editor, password protection and a use log.

Separate personalized desktop utilities, such as a calendar, a telephone list, a notepad and a calculator, can be configured for each user of a system.

DS Manager costs $79.95.

Design Software, 1275 W. Roosevelt Road, West Chicago, Ill. 60185.

Development tools

A 32-bit operating multiuser operating system designed for use with Intel Corp. 80386-based microcomputers has been announced by **Theos Software Corp.**

Theos 386 is said to support up to 128 users by running in the 80386 chip's protected mode. According to the vendor, it can physically address up to 4G bytes of memory with a virtual memory space of 64 terabytes. Other features, designed to offer compatibility with IBM's PC-DOS, Microsoft Corp.'s MS-DOS and Unix, include I/O redirection, command pipes and a hierarchical directory structure.

Theos also announced Theos C, a companion C compiler said to serve as a bridge to other operating systems.

Theos 386 costs $799. Theos C costs $599.

Theos Software, Suite 360, 1777 Botelho Drive, Walnut Creek, Calif. 94596.

Software enhancements

International Microsystems, Inc. has enhanced its labeling software program for IBM Personal Computers and compatibles to include bar code capabilities.

Labelmaker II provides support for the Code 39, UPC, Codabar and Interleaved 2 of 5 bar code types. The software features window menus. It is said to work with dot matrix printers and can print full-color labels. Supported data types include serial numbers, date, time and set size. Also, text strings, such as names and addresses, may be imported from another data base or mailing list program. Six font sizes are included.

Labelmaker II costs $395.

International Microsystems, 790 E. Arques Ave., Sunnyvale, Calif. 94086.

Data storage

Qualstar Corp. has introduced the **Ministreamer**, a nine-track reel-to-reel tape drive for Apple Computer, Inc. Macintosh personal computers.

The IBM- and ANSI-compatible drive offers an internal small computer systems interface (SCSI) controller. It handles both 1,600 and 3.2K bit/in. and up to 3,600 ft of tape. Reels can be moved from the Macintosh to IBM Personal Computers, minicomputers or mainframes without loss of data, the vendor said.

The Ministreamer costs $3,995. Macintosh SCSI tape-utility software costs $500.

Qualstar, 9621 Irondale Ave., Chatsworth, Calif. 91311.

Printers/Plotters/Peripherals

Panasonic Industrial Co.'s Computer Products Division has announced a 24-pin dot matrix printer and an 11 page/min laser printer.

The **KX-P1524** dot matrix printer features print speeds of 240 char./sec. in draft mode, 160 char./sec. in text mode and 80 char./sec. in letter-quality mode.

The **Laser Partner** has five built-in emulations, including Hewlet-Packard Co. Laserjet Plus and Epson FX-85. It offers face-down output.

The dot matrix printer costs $899. The laser printer costs $1,999.

Panasonic, 2 Panasonic Way, Secaucus, N.J. 07094.

VSAM Performance & Tuning Considerations

A look at the reasons to tune, the tradeoffs, performance improvements, tips on reducing VSAM disk space utilization.

By Richard A. Larsen

VSAM

What Got Your Attention Is A Very Sharp Focus on VSAM

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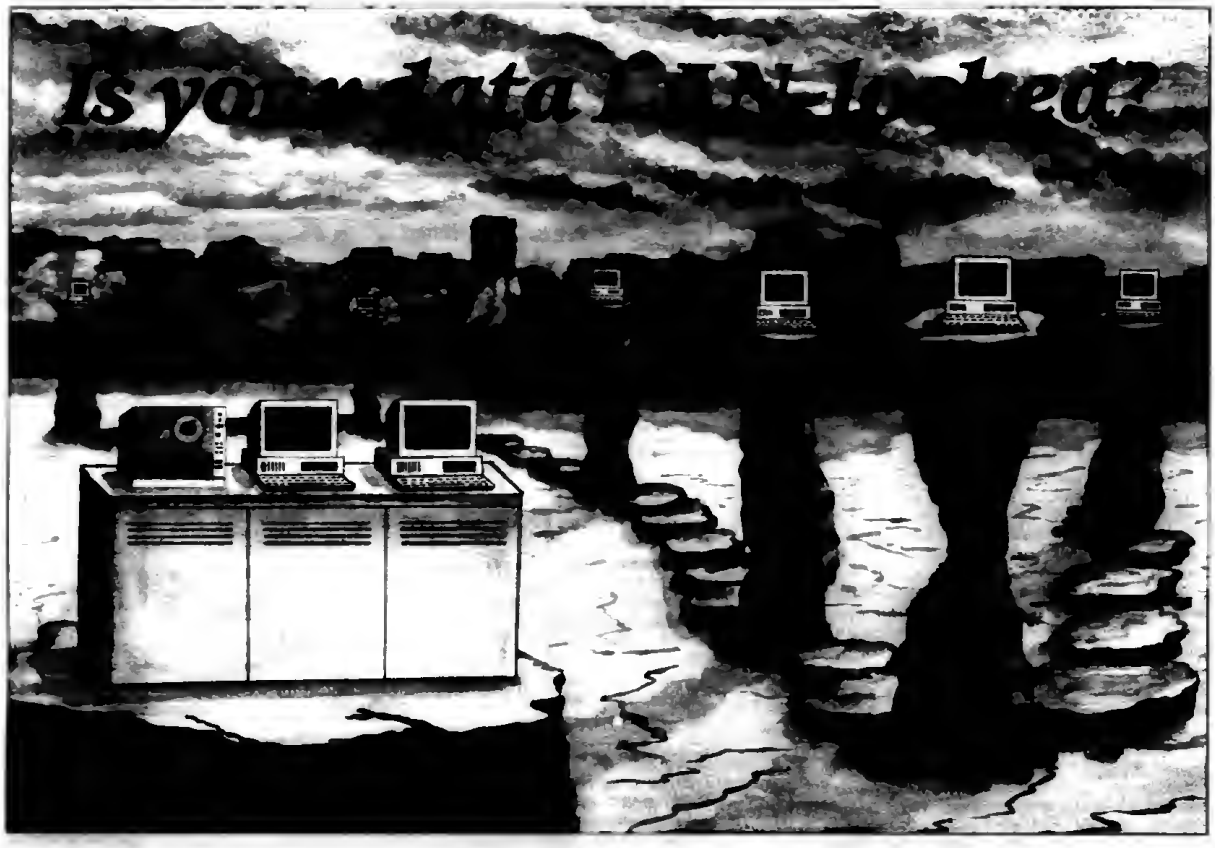

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DATA STREAM

Patricia Keefe

3Com head shields blows

Fit to be tied. 3Com Corp. President Bill Krause is hopping mad over a report on Novell, Inc. written by Alex Brown & Sons that takes a couple of shots at 3Com. Krause had already gotten a number of calls concerning the report by the time we caught up with him at the recent Macworld Expo.

The report maintains that 3Com's 3+ network software has been losing market share, which has hurt 3Com's growth and profitability. "Absolutely untrue," Krause snapped. He claims the analyst is unfairly factoring in the sales of all Novell subsidiaries when comparing the growth of both companies. Also fueling Krause's ire is a statement in the report claiming that "early evaluations of the OS/2 redirector indicate that, while a significant improvement over DOS, the execution in a networking environment may still be unsatisfactory."

It's worth noting that Alex Brown is Novell's banker. Moreover, Novell is pretty miffed over what it claims are attempts by 3Com and Microsoft Corp. to spread untrue reports that it will not or can not develop file server software compatible with its MS OS/2.

Your server. Following 3Com's recent announcement that it will comarket and possibly resell Atlantic Microsystems' line of fault-tolerant file servers, look for Novell to announce price cuts on its own fault-tolerant family, System Fault Tolerance (SFT). A spokeswoman claims Novell planned the cost reductions prior to 3Com's announcement. Oh. It will be interesting to see whether a 3Com fault-tolerant product featuring server mirroring will speed up the release of Novell's own server-mirroring product, SFT Level III.

Tying up the loose ends. The strategic alliances continue to pile up in Utah. Novell will

Continued on page 45

Much ado about nothing?

Ungermann-Bass, analysts square off over firm's management changes

BY PATRICIA KEEFE
CW STAFF

ANALYSIS

The resignation two weeks ago of a key member of Ungermann-Bass, Inc.'s management triumvirate has some analysts concerned that the general-purpose networking vendor might drift into a holding pattern while struggling to resolve management woes.

Company officials disagree, pointing to the latest change in operations structure as yet another example of Ungermann-Bass's ability to respond quickly and decisively to problems. Cofounder and Chief Executive Officer Ralph Ungermann also had some scathing comments for financial analysts who he said are "talking down" the company simply because it has not performed according to their expectations.

Fueling this squabble is the recent snowballing of management and marketing problems that have caused a number of network vendors to stumble in the past 12 months, compounded by the more recent second organizational restructuring in just over a year at Ungermann-Bass.

Just 13 months after joining the company, Chief Financial Officer Robert K. Dahl resigned, reportedly in frustration over the limited success of Ungermann's three-member management team, according to analysts who spoke with Dahl.

Other members of that management team were Ungermann and Joe Shoendorf, who headed up the company's joint venture with General Motors Corp., the industrial networking group.

Dahl was concerned that the company lacked a clear line of authority, according to Richard Kimball, an analyst with Montgomery Securities. The decision-making process became too cumbersome, said Cecilia Brancato, an analyst with Oppenheimer & Co.

Dahl, who is credited by analysts and a company spokesman with implementing numerous cost-control measures, expressed concern over recent reports alleging political strife at Ungermann. "Those reports are not true," he said, adding that the changes were first discussed in March.

Remolding

Ungermann said he, Dahl and the board of directors agreed that it was necessary to reshape the company into a single operating entity. "We had a number of independent business units and a management committee managing those units, and it definitely was not as cost-effective as we wanted it to be," Ungermann said.

Having dissolved the committee, "We further agreed that the best thing to do was for me to take that role [of chief operating officer]," he added. At that point, Dahl decided "maybe something else made better sense in his career," Ungermann said, stressing that Dahl was not forced out. "He'll stay on the board and work with the company as a consultant."

At issue here isn't so much whether internal political strife exists at Ungermann-Bass, but whether Ralph Ungermann, who is generally perceived as the engineering force behind the company, can also handle the management chores. Analysts tend to doubt it, while Ungermann says he has done it all before.

"Ralph should become chairman and delegate running the company to people with operations experience," Kimball said. Analysts fear Ungermann is taking on more than he can handle. Meanwhile, the company could stagnate while competitors, such as rival Bridge Communications, Inc., race onward.

Analysts also maintain that the company has been marginally profitable over the last four quarters and is implementing a new management structure at a time when Bridge is close to doubling its size.

Continued on page 45

Low-end switcher joins fray

CALABASAS, Calif. — Addressing the increasingly competitive low-end packet-switching market, Protocol Computers, Inc. last week introduced Smartnet 3700, a 16-port switching device said to include a range of features, such as configurable software.

With prices beginning at $6,400 for a six-port version, Smartnet 3700 is intended to fill a gap in the firm's low-end CCITT X.25 product line.

Protocol Computers is a subsidiary of Telematics International, Inc.

The 3700 is compatible with the company's other Smartnet packet switches and packet assembler/disassemblers (PAD).

The introduction comes on the heels of Tymnet, McDonnell Douglas Network Systems Co.'s announcement two weeks ago that it is developing a low-end

Continued on page 44

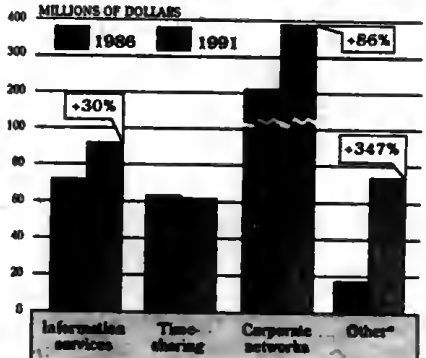
Inside

- Novell gives nets running Netware access to asynchronous resources. Page 48.
- Dual Enterprises device gives full-definition picture of RS-232C lines. Page 48.

VAN clan starts corporate, vertical market move

Value-added networks

Market segment forecast of revenue and percentage change predicts future lies in corporate networks and relatively new services



* Includes billing services and emerging services such as electronic data interchange, credit authorization, electronic payments, electronic markets and data banks.

INFORMATION PROVIDED BY LINK RESOURCES, INC./INTERNATIONAL DATA CORP.
CW CHART

BY ELISABETH HORWITT
CW STAFF

Although value-added networks (VANs) have traditionally been used as inexpensive pipelines to information and time-sharing services, VAN suppliers have recently begun to concentrate their marketing and development efforts on supplying corporate networking needs as well as applications for vertical markets, according to a recent report by Link Resources, Inc./International Data Corp. (see chart at left).

VANs, which first appeared in the 1970s, initially offered packet-switching services as a cost-effective way for customers to access commercial data base and time-sharing services. However, these two markets have begun to dry up. Link's five-year forecast indicates flat growth for the time-sharing market and a 30% accumulated growth for the information services delivery segment.

Hope for future growth lies in corporate networking and in application-oriented niches like electronic data interchange, billing and credit authorization, Link said. VAN revenue from the former will grow 86% between 1986 and 1991, while revenue accrued from the latter will grow 347% during the same period, Link predicted.

For example, major carriers like GE Information Services, a division of General Electric Co., and Tymnet, McDonnell Douglas Network Systems Co. have been providing network applications in vertical markets such as the oil and medical supply industries.

VANs have a better chance of succeeding in specific vertical niches than as plain vanilla transport service providers, Link said. The report cites several

Continued on page 44

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY
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COMPUTERWORLD

...duction-oriented VM/XA

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SYSTEMS & PERIPHERALS

...sers say DPS 7 top system

...y shows Honeywell boosts overall satisfaction; Amdahl posts gains

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...M.J.—Once ... 3.2 on a four-point scale, ... at least 20 user re... sponses and no ratings ... lower than 2.8. ... Datapro, a market re... search firm, said users ... rated 1,261 mainframes ... on questionnaires as ... part of the 14th annual ... Datapro user-satis... faction survey. ... A five-year average ... of overall satisfaction ... scores showed Unisys ... on top at 3.230, followed ... by National Advanced ... Systems Corp. (NAS) at ... 3.205, Amdahl at 3.202, ... IBM at 3.160, Honey... well Bull at 3.14 and ... NCR Corp. at 3.077. ... Datapro analyst Mari... Joy Courtney noted that ... this Honeywell Bull and ... DPS7 scored better this ... year than it had in the ... past, climbing from a ... 3.1 overall satisfaction ...

faction score of at least ... areas such as ease of ... operation (3.62), re... liability of the mainframe ... (3.72) and services such ... as maintenance, techni... cal support, education ... and documentation. ... Amdahl also led the field ... in user recommen... dations; 97% of its users ... said they would re... commend Amdahl sys... tems to other users. ... NAS finished second in ... that category and scored ... well in other areas but ... fell short of the 20... response minimum for ... special mention and ... finished last in overall ... satisfaction at 3.13. ... Unisys systems and ... the corporation as a ... whole earned the high... est scores or tied for ... the highest in 17 catego... ries, with the third-ran... ked Amdahl ... ...ed by ... ...data proc... ... Courtney also no... ...ported that mid... ... the other ... ... in ... ... of ... ...

... of the company's older ... frames increasing, with ... systems: the 8500, 8600 ... 53% of the systems sup... and 8800. The NCR ... porting more than 60 ... 9800, introduced last ... local terminals and 46% ... year, was not mentioned ... supporting more than ... by users. ... 60 remote terminals. ... The poorly rated Unisys 1100/60 was the ... Last year, 50% sup... oldest single system, ... ported 60 local termi... with an average life of ... nals, and 45% supported ... 58 months. ... 60 remote users. ... **Trend in buying pattern** ... Datapro also noted ... Datapro detected as ... that users continued an ... trend in the pattern of ... alternating pattern in ... system acquisition; only ... connection with their ... 28% of the respondents ... expansion plans for ... said they own their com... this year. Expansion to ... puters, compared with ... current hardware con... 54% in 1986 and 59% in ... figurations, indicated by ... 1985. The number of ... 43% of users, surpassed ... users leasing systems ... expansion of data com... from the manufacturer ... munications facilities, ... rocketed upward from ... named by 63%, to ... 14% to 19%, while 25% ... head the list for 1987 ... of the users said they ... acquisition. ... leased systems from ... **Software growth** ... third parties. ... slowed ... Courtney also re... ...pansion had ... ported that mid... ...ahead of ... the other ... ...ground last year. ... in ... ...ilong down ... of ... ...up in ... ...

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Honeywell Bull

Customers are more important than computers.

VAN clan

FROM PAGE 41

major competitors in the transport arena, including local packet-switched networks provided by regional Bell holding companies, satellite-based very small aperture terminal networks and virtual private networks offered by the major interexchange carriers.

VANs under fire

A recent phenomenon that threatens the established VANs' customer base is the growing number of Fortune 500 companies that are reselling their private networking facilities and expertise — among them American Airlines and Sears Communications Co.

Sears, for example, recently persuaded Advanced Micro Devices, Inc. (AMD) to switch over from Telenet's service, according to Link, with promises of better IBM terminal-to-host connections over Sears' own extensive IBM Systems Network Architecture (SNA) network.

AMD's defection from Telenet stemmed in part from a perception "that it is easier to solve networking issues by working with another user than with a vendor," Link said. The Sears network, which uses private T1 lines for its SNA connections, is expected to cost AMD significantly less than what the company paid Telenet on a monthly basis.

AMD's decision carries two potential danger signs for VANs, Link warned. First, IBM shops require effective, low-cost SNA-to-X.25 integration if they are to be weaned away from T1 networking.

Second, with the increasing amount of comparison shopping going on, VANs must continually add value to their offerings and search out new market niches, or they may lose out to a new wave of aggressive competitors.

VALUE-ADDED NETWORKS' hope for future growth lies in corporate networking and in application-oriented niches.

Switcher

FROM PAGE 41

eight-port switch priced at $8,000.

Like the Tymnet device, Smartnet 3700 is targeted largely at branch offices of companies recording financial transactions.

The company said the 3700 is certified to operate with packet-switching services from AT&T, Telenet Communications Corp. and Tymnet.

"We have filled the gap at the low end because we have been seeing a lot of demand" for low-cost switching devices, said Sam Stavro, vice-president of marketing and development.

Smartnet 3700's key features include the ability to download software or new operating systems onto the switch's diskette, the ability to set four of the X.25 links at speeds up to 64K bit/sec. and the option of upgrading the unit with a PAD, Stavro said. The high-speed links can be configured for either CCITT V.35 or RS-232 connections.

Remote monitoring

With the unit's resident network management software, users can configure operating parameters, update routing tables, monitor performance and retrieve statistics either locally or from other points on the network.

Built around an Intel Corp. 80286 microprocessor, Smartnet 3700 reportedly switches more than 100 packet/sec. The model comes with 250K bytes of buffer space for high-speed switching and line concentration. Network management can be centralized with the vendor's Smartview software, which runs on the IBM Personal Computer AT.

Smartnet 3700 will be delivered within 30 days after orders are taken, Stavro said.

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Resource Impact Profiles

A second breakthrough tool called Impact Profiles

3Com head

FROM PAGE 41

announce a development agreement with Excelan, Inc. this week and a second next week at a PC Expo press conference.

In addition, Novell will announce new hardware and software. The software appears to be yet another Netware upgrade, but the hardware is new.

We're guessing that the Intel Corp. 80386 file server, or perhaps an X.25 hardware card, is in store.

Creeping along. Anxious users of Banyan Systems, Inc.'s Vines network operating system can expect to see the latest release in November, according to sources.

Besides LU6.2 capability, the new release will provide better interaction with the Transmission Control Protocol/Internet Protocol environment; take advantage of the 386, using AT&T's 386-compatible Unix System V Release 3; and provide tool kits and applications program interfaces for the LU6.2 and Unix environments.

More recently, Banyan has unveiled a new value-added reseller program as part of its effort to beef up its user base.

Court and spark. Digital Communications Associates' (DCA) purchase last month of low-end network vendor Fox Research, Inc. has apparently not satiated its desire to purchase network technology.

Targeting higher end networking, DCA is said to be looking hard at Ungermann-Bass, Inc., which recently reported unexpectedly low quarterly results and is having some problems, according to analysts.

President Ralph Ungermann would not confirm or deny the rumor, saying only that "there's nothing to comment on." Ungermann, we should note, is more than a little steamed over recent reports detailing political strife racking his namesake. It ain't so, he says.

David and Goliath. Meanwhile, busy Fox plans to demo an unbundled version of its 10-Net Netbios version network software on a variety of network hardware, including IBM's Token-Ring, at PC Expo.

Any Netbios-compatible adapter card can run Fox's software, a spokeswoman says. Unbundling 10-Net software would pit Fox against Novell.

The question remains: Even with DCA's bucks, can the sly Fox outwit Novell?

Well, I wonder. Hmmm, Apple has been advertising for people to help write documentation for Unix networking. Tie that in with its recent $1 million investment in SQL-compatible data base vendor Sybase, Inc. and low-end workstation-targeting Sun, and it sure looks like Apple Computer, Inc. is targeting Sun Microsystems, Inc. with a vengeance. Of course, any serious attack will have to be proceeded by Apple and its dealers figuring out how to position Unix.

Keefe is a ***Computerworld*** *senior editor, networking.*

Much ado?

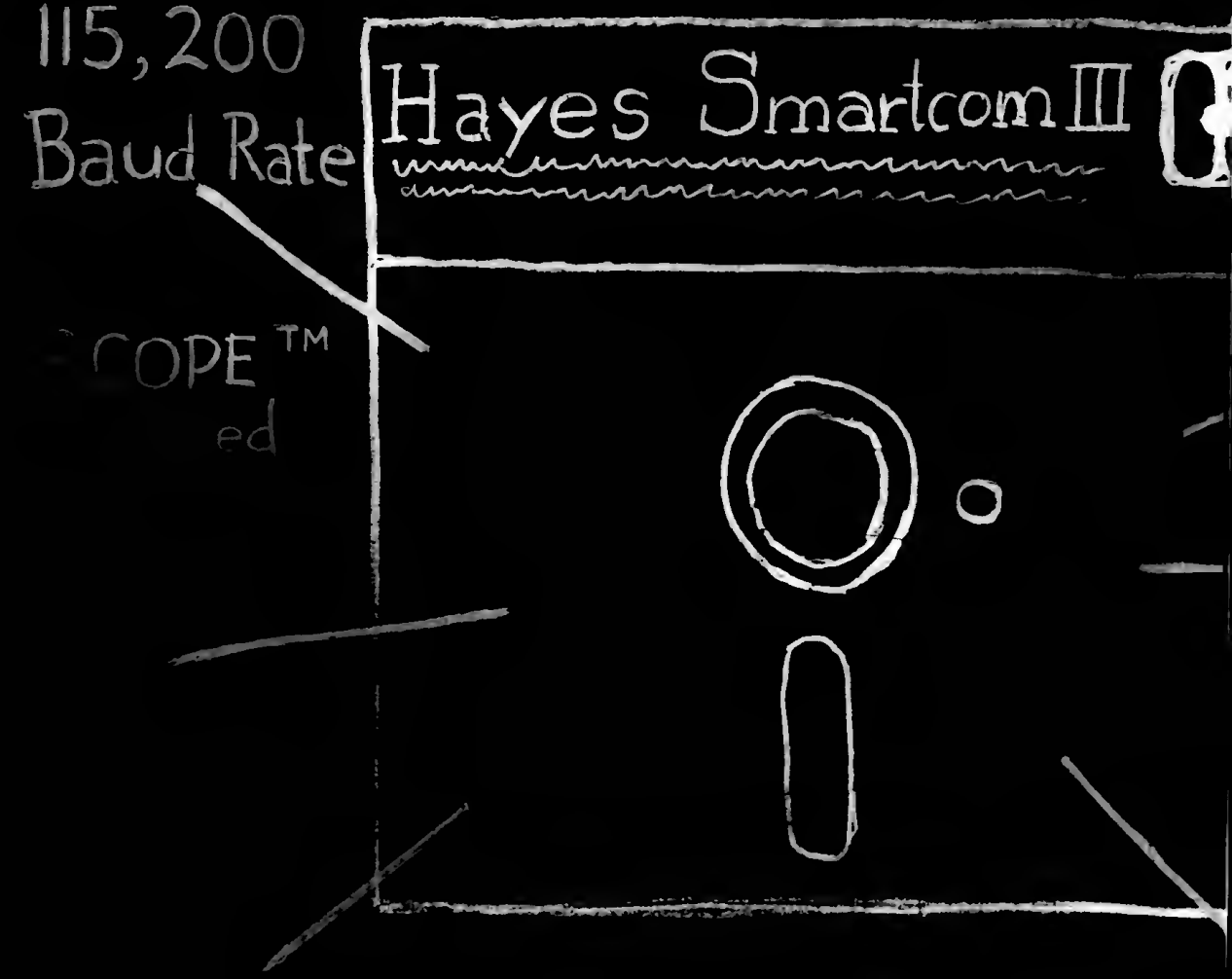
FROM PAGE 41

"I do not think they understand the issues in the company. You have to look at the success the company has had," Ungermann responded, clearly stung by analysts' criticisms.

He claimed that Ungermann-Bass' revenue has grown 60% year to year, adding that quarterly revenue was up 16% in the first two quarters. "I don't know what marginally means," he said. Ungermann-Bass made a large investment in the Manufacturing Automation Protocol (MAP) market, which Ungermann admitted has taken off slower than anticipated.

To compensate for that, the company is reallocating resources to support more profitable areas such as its office network business. "Our core business is very solid," Ungermann said. However, Ungermann remains committed to the MAP venture, he said.

THIS TIME WE OUTSMARTED



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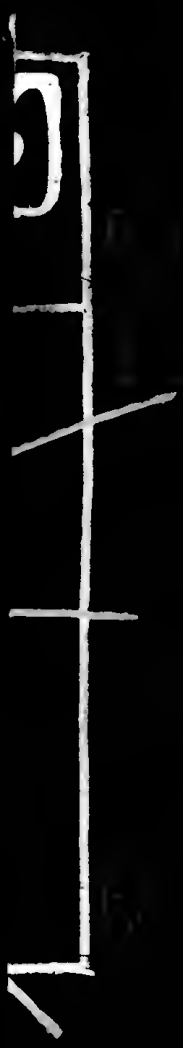

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NEW PRODUCTS

Local-area network hardware

A hardware and software system said to turn an IBM Personal Computer, PC XT, AT or compatible into a multiuser, multiprocessor Microsoft Corp. MS-DOS system running the Novell, Inc. Netware operating system has been announced by **The Network Link**.

The basic hardware component of the **Quicklink** system is the Quicklink card. A standard PC-compatible ASCII terminal connects to the card, providing a complete MS-DOS workstation to the multiuser system. Up to 51 Quicklink cards can be configured on a single system. Multiple PC file servers can be interconnected for further growth.

Quicklink operates under Novell's Netware/86 or Netware/286. Each Quicklink board costs $1,095.

The Network Link, Building H-10, 3303 Harbor Blvd., Costa Mesa, Calif. 92626.

Links

Novell, Inc. has announced an asynchronous gateway said to provide local-area networks running its Netware operating system with access to asynchronous resources.

The gateway, called the **Netware Asynchronous Connection Service** (NACS), provides access to the resources through a direct connection to a minicomputer or through modems to remote minicomputers. Access to information services is also provided.

Novell also announced the **Netware Asynchronous Board**, designed to allow personal computers to run off-the-shelf communications programs such as Microstuf, Inc.'s Crosstalk or Hayes Microcomputer Products, Inc.'s Smartcom II.

NACS costs $1,095. The Netware Asynchronous Board costs $149. Both will be available in the third quarter, the vendor said.

Novell, 122 E. 1700 South, Provo, Utah 84601.

Electranic mail

CC:Mail, an electronic-mail package designed for local-area networks (LAN), now offers **Profslink**, a gateway from LANs to IBM Professional Office Systems (Profs) users on mainframe computers, **PCC Systems, Inc.** has announced.

Profslink provides an automatic and transparent connection betweeo any LAN running CC:Mail and any mainframe computer running Profs. The bidirectional link allows personal computer users and IBM VM mainframe users to exchange both text and file messages. Profslink automatically takes care of all connections and delivery and receipt of messages to and from Profs. Connections can also be programmed to the individual needs of the company.

Profslink costs $995 per gateway.

PCC Systems, Suite 201, 480 Calfornia Ave., Palo Alto, Calif. 94306.

Madems/Multiplexers

Develcon, Inc. has introduced the **Model 7141** single-card integral statistical multiplexer for use with its Develnet Networking Data private branch exchange.

The Model 7141 is said to multiplex up to 48 channels over a single synchronous link. Channels can operate at speeds of up to 9.6K bit/sec. Link protocol is CCITT X.25 Level II.

The Model 7141 is priced at $4,000.

Develcon, Suite E, 6701 Sierra Court, Dublin, Calif. 94568.

Hayes Microcomputer, Inc.-compatible 2,400 bit/sec. internal modems for use with laptop computers have been announced by **Megahertz Corp.**

Called the **Easytalk 2400** series, the modems include Crosstalk communications software. Compatible with the IBM Personal Computer AT command set, the modems feature automatic answer, dial disconnect, adjust to incoming data speed, full- or half-duplex operation over dial-up phone lines and U.S. and international compatibility.

The modems were designed for use with Toshiba, Inc.'s **T1100 Plus, T3100**, T1000 and T1200 computers. They will be available in September priced at $599.

Megahertz, Suite 2-102, 2681 Parleys Way, Salt Lake City, Utah 84109.

Diagnastic equipment

A device said to provide a full-definition picture of all 25 lines in an RS-232C data communication circuit has been introduced by **Dual Enterprises Corp.**

By means of 50 red and 50 green LEDs, the **Model T-701 RS-232 Tester** indicates the signal status of all the lines, mark, space and clocking. The LEDs moniter all 25 lines on both the data communications equipment and data terminal equipment sides. In addition to switches to break any of the 25 lines, two switches are given to reverse lines two and three. Strapping posts are provided for cable reconfiguration, and gender connectors with extension cables are permanently attached to the unit.

The T-701 costs $220.

Dual Enterprises, 21 Maple St., Centereach, N.Y. 11720.

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SPOTLIGHT

SMALL-SYSTEM DBMS

Microcomputer DBMS is on the verge of a boom as mainframe software companies and established micro software providers compete for a stake in a new proving ground.

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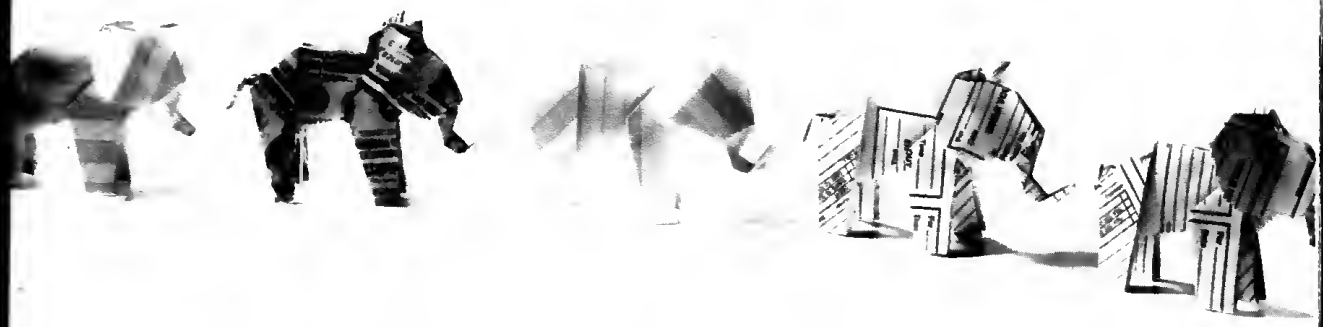

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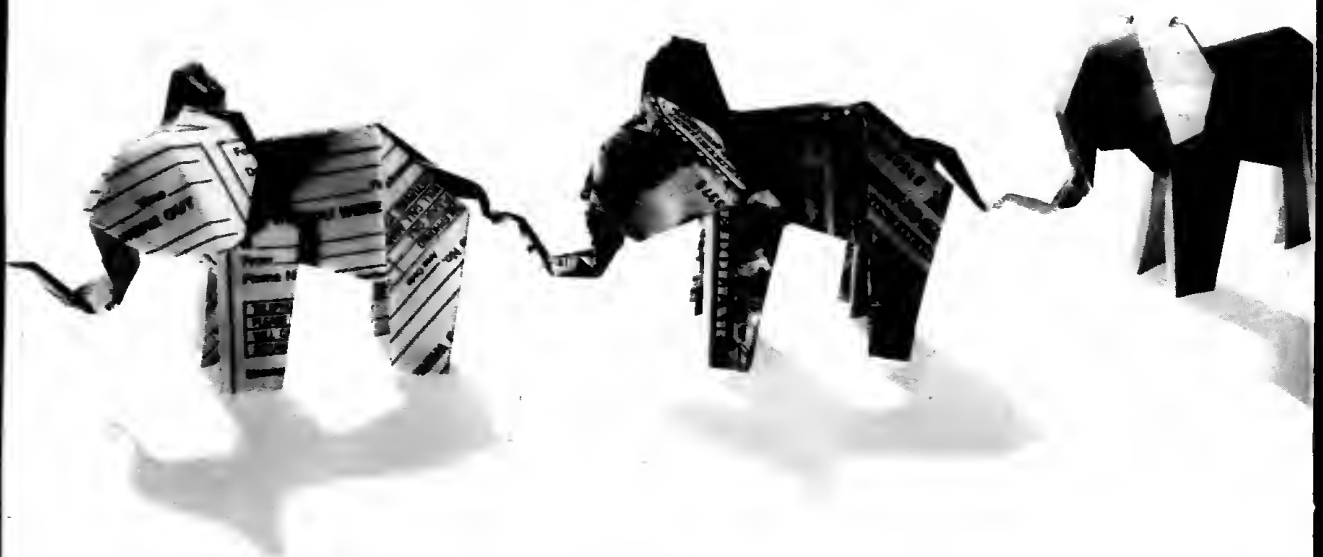

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For a detailed evaluation of what your company stands to save – and to gain – from an AT&T System 85, please contact your AT&T Account Executive. Or call 1 800 247-1212 for the AT&T office nearest you.

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INSIDE

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Winner by Decision
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Product Chart
A detailed guide to data base management systems for small systems. Page S11.

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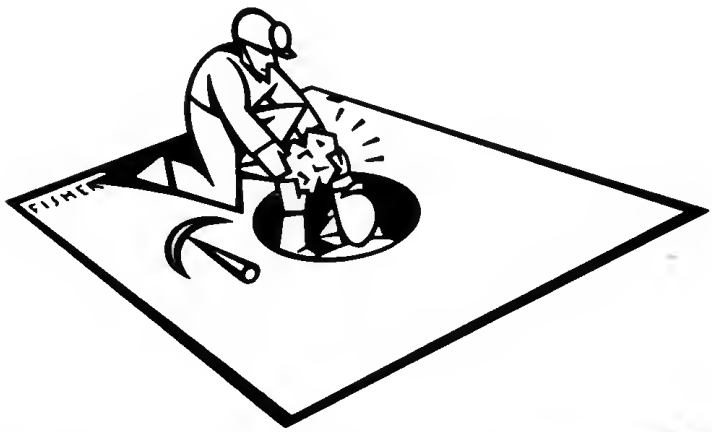
Micros are a rich vein for DBMS developers. By digging there, they hope to reach end users as well as programmers.

GOLD RUSH IN PC TERRITORY

BY RUSSELL LIPTON



MARK FISHER

Once, not so very long ago, there were little computers called micros. And MIS laughed at them because they were named after a fruit, and no one could do anything useful with them. Then along came Dbase II, and hundreds of thousands of people began using this product to produce data bases unlike any data base known to the keepers of the Big Machines. And data ran amok. When the giant, IBM, declared micros were really OK, everyone decided to make money by writing data base software, and products proliferated on the face of the installation. Even the servants of the Big Machines contributed PC-Focus and Oracle. However, all was not happiness because memory ran short, and connectivity was lacking. And over all of this, IBM wrote "C-H-A-O-S."

Now comes the promise of OS/2, MS OS/2, OS/2 Extended Edition, OS/2 Extended V.2 and more. And now venerable Dbase III Plus shall write and read SQL forever — even up to billions of records. The power users smile and look forward to change with anticipation.

But what about the average end users? Do they understand the issues involved? Do they need such great power? Do they know IBM and everyone else now battles for control of these "mainframes-on-a-desk" that, once upon s time, were fun?

Cordial but not personal

Micro data base management system products are poised for some major changes. This transformation is being pushed by the availability of more powerful processors (Intel Corp.'s 80386 and Motorola, Inc.'s 68020) and operating systems (notably IBM's OS/2) that may make it possible for DBMSs to serve as the environmental hub of the software of the 1990s.

Whether this role enhancement takes place at all, and to what extent, depends mostly on how corporations resolve the always-delicate issues of freedom and control posed by the microcomputer. On one hand, companies benefit from the entrepreneurial drive and initiative of their employees. The wild-and-woolly world fostered by personal computer software has, on the whole, provided s healthy, creative spark to the often lumbering central computing organizations.

On the other hand, corporate information professionals are rightly charged with the care, maintenance and security of the corporation's lifeblood — its information. This mission requires the establishment of scrupulous software standards and methodologies that brook little deviation.

Until now, the difficulties of connecting PCs to other machines and, even more important, of attempting to trade applications and data between machines has acted as s kind of natural barrier to real chaos. The user who knows how to move data has typically had s keen awareness of corporate data sensitivity.

In the not-too-distant future, however, architectures like Systems Application Architecture (SAA) from IBM will seamlessly link corporate users, and all users will send their data around

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Gold rush

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the networks to interact — for good or ill.'

No one denies that it is possible to make the microcomputer an extension of the total constellation of corporate machines. Is it desirable, however, to so drastically reshape "personal" computing? And is it possible to do so without a revolt from the users involved in it? Many people originally bought single-user personal computers, from their own discretionary budgets, to do personal work. Now, these machines are in danger of becoming just another node on the mainframe.

In fact, the challenge facing software developers — particularly the developers of DBMSs — is to retain or increase the personal feeling for the end user while maximizing the internal, carefully managed interface to the total corporate computing resource. This effort parallels those of system software companies like Microsoft Corp. to hide the exploding complexity of MS OS/2 through presentation environments like Windows.

As Shaku Atre, president of Atre International Consultants, Inc. in Rye, N.Y., points out, "DBMS products are important and will become more so, but we have to acknowledge that, for the true end user, they are still far too difficult to use comfortably."

Trends in micro DBMS

There is no hope of stopping change, however. Micros will be tied to larger systems, and, because DBMSs offer the potential to arbitrate and monitor the passage of data between all types of machines, they will have to expand in the direction of that potential. In fact, a number of trends are already beginning to reshape micro DBMSs:

- The nature of these products is shifting from simple flat-file managers to full-blown data base managers.
- The PC marketplace is rapidly becoming the focal point of all DBMS software efforts, and this concentration will probably continue for at least the next five years.
- OS/2 is exerting a tremendous influence on emerging DBMS products, as are the implications of networking and departmental-mainframe connectivity.
- A headlong rush toward SQL products is taking shape, which brings up issues concerning the relation of SQL to application development and fourth-generation languages.
- There are developments waiting in the wings that relate to application generation, integration of expert systems and interfaces to compact disk read-only memory (CD-ROM) and allied technologies.

While all of the above refers to the IBM world, critical developments are also occurring within Apple Computer, Inc.'s family of products.

Apple's Macintosh continues to be the unheralded source of almost all PC inspiration in the development of user interfaces. The Macintosh II is the first machine with the potential to bring Apple squarely into the offices of true-Blue corporate sites to do heavy computing, especially with Apple Chief Executive Officer John Sculley beginning to make the right connectivity moves for his offering.

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Bill Kirwin, program director for personal computing at the Gartner Group, Inc., is a strong booster of the Macintosh, although he specializes mainly in the IBM marketplace. "Basically," he says, "Apple is able to deliver today what will be available on OS/2 by 1990. The irony is that IBM has largely created a Mac clone, blessed Apple and then said that their own usable machine won't really be available for two years."

With the user interface to DBMS offerings growing in importance, we should expect to see both convergence and increased competition between the IBM and Apple architectures.

Pathway for users

There is still the question, though, about how much all of this will, or should, impact the typical user. In an marketplace that is choked with DBMS products ranging from simple flat-file managers to products that are down-sized but otherwise faithful reproductions of complex mainframe products, how is the user to proceed?

It is true that the risks for software consumers grow in direct correlation to the creative ferment taking place. Fortunately, while it has become increasingly difficult to segment product offerings, it is still rather easy to define differing classes of users. From there, we can begin to make sense of the types of DBMS products that are of potential value to these differing groups.

The first class of users — and, in fact, by far the smallest class — consists of professional programmers and application developers. This segment is in seventh heaven about upcoming DBMS trends. They want and require sophisticated products that provide industrial-strength data definition languages, flexibility in specifying data navigation pathways, procedural facilities for building turnkey applications and, not least, extensive tools for managing networking and security.

This class is, as a result, strongly attracted to the types of products discussed so far. As a matter of fact, many of those in it are already faithful customers of one or more of these companies: Ashton-Tate, Microrim, Inc., Oracle Corp, Information Builders, Inc. Informix Software, Inc. and Relational Technology, Inc. Many other companies, such as Data Access Corp., with its product Dataflex, and Cosmos, Inc. with Revelation, also directly target this class.

A much larger pool of customers consists of the class of computer-literate but nonprogramming users of microcomputer DBMSs. This group is often one of the targets of applications designed by the programmers listed above. Additionally, this class often builds its own applications, but these are for its own use or for rough-and-ready employment within small corporate departments.

The requirements of these applications for connection to other machines are minimal or nonexistent. Not surprisingly, this group of customers is easy bait for every developer in the industry.

> "DBMS products are important and will become more so, but we have to acknowledge that, for the true end user, they are still far too difficult to use comfortably."
>
> SHAKU ATRE
> ATRE INTERNATIONAL CONSULTANTS, INC.

The big boys are trying to attract this customer group with friendly reporting tools that can be used to access and manipulate data residing on departmental and mainframe machines. Vendors argue that their simpler application development facilities are usable by any literate end user. This argument is now, for the first time, truly credible, but it remains to be seen whether this type of customer can, or should, be captured by the high-end products.

After all, this user typically requires no less, but also no more, than the following from a microcomputer DBMS product: stable, simple flat-file management structures, maximum ease in defining and maintaining files, a transparent interface to spreadsheet products and visual query systems for retrieving data.

The good news is that there are literally dozens of slick, professionally done PC and Macintosh products that deliver the requisite functionality and ease of use. The bad news is that there are so many that picking one can be perplexing. Fortunately, once it becomes clear that a given company can provide the needed features and reputable support, the rest is largely a matter of taste.

Matching the competition

Two of the best-known PC products, with good reason, are Paradox from Ansa Software and Q&A from Symantec Corp. Both are almost powerful enough to stand comparison with some of the products designed for programmers and provide true ease of use for managers and nonprogrammers.

Both products also emphasize the user interface: Paradox features similarity to Lotus Development Corp.'s 1-2-3 and provides Query-By-Example forms for retrieving data, and Q&A emphasizes a natural-language module (the Intelligent Assistant) that, while a bit awkward, delivers genuine English-like capabilities. In addition, Q&A provides an unusually powerful word processing module that gives a synergistic range of functions to the nonprogrammer.

Another product worth mentioning is Powerbase from Compuware Corp. Powerbase is a menu-driven flat-file manager with a simple, sensible and even elegant user interface that incorporates seemingly major modules like screen painters, function definitions like data validation and indexing in nearly transparent application-building sequences.

It is arguable that the above products are not significantly easier than the big boys' products. "You could say that the Paradox interface is easier to learn than the Ashton-Tate Dbase command language," says Adam Green, lecturer and writer on DBMS. "But Paradox is like Dbase in that you go back to the programming language to build complex applications, and the programming language is no easier."

The difficulty in defining, describing and designing data base is fairly constant because the conceptual problems of data base management are basically the same across all the products on the market. If there is a difference, it is in the degree of ease provided by the user interface. For this reason, it is not so much that a product such as Paradox is simpler or less robust than Dbase, but rather that it is somewhat easier to use. This demarcates the somewhat different market segment for which Paradox is targeted.

Lazy man's DBMS

Finally, we come to the largest class of users. This class needs to use computers but does not particularly enjoy doing so and wants to interact with them as little as possible. We can describe this group by saying, without the slightest condescension, that they want to manipulate data bases without being required to know how to define the word "data base."

While the IBM world has many products to offer this customer group, and companies like Ashton-Tate, with the now-abandoned Friday and the new Rapidfile, have sought to sign these users up, most in this group would rather fool around with the data management capabilities of 1-2-3 and Lotus's Symphony than move their hard work to any dedicated filing product.

This has not been so true on the Macintosh, where a host of simple and genuinely useful products have appeared. One in particular, Filemaker Plus from Microsoft and Forethought, Inc., is a superb, graphically oriented file manager suitable for use by beginners.

Fortunately, whatever the future may come to pass for users, be they programmers, power end users or novices, one thing is quite certain: A software marketplace that has historically been driven by word processing and spreadsheets will soon be largely driven by DBMSs.

This means many of the advances promised by OS/2 on the IBM Personal System/2 class of machines and by Apple on the Macintosh will appear first in these products. It also means that for vendors and users active in the field, the next five years will bring exciting new products to light while forcing obsolete versions into needed transformation. This is hardly bad news for any user.

It is no longer as easy to define DBMS products for microcomputers, but there is one generalization that can be safely made: Today's products are, for the first time, offering true DBMS capability.

Until this year, most so-called DBMS offerings were not "systems" at all but simple flat-file managers with a modicum of added features to provide flexibility and ease of use to beginners. There was, and is, nothing wrong with providing these kinds of products. However, it has been misleading at best and

intentionally deceptive at worst for marketers to appropriate data base terminology with recognized meaning and tack it onto these offerings.

A DBMS is first and foremost provided to eliminate the costly reprogramming required when directly manipulating bytes, record links and indexes at the operating-system or operating-file level.

By separating the data itself from the specification of the descriptions and operations ranging across that data, DBMS products enable users to consider their problem in terms of "customers" and "products" instead of "pointers" and "physical sequence." Microcomputer products have indeed provided this basic capability.

Unfortunately, the provision of this capability implies provision of other, far more sophisticated functionality, which has often not been present.

Rich data-definition languages are needed in order to describe and model the structures of the included data. Data manipulation languages give users the means to retrieve, update and otherwise query their data bases. Security modules provide fine control of access to the data base. Carefully designed rules must arbitrate the interface of the DBMS to the external environment, which is typically a multiuser one. Finally, programmability must be provided to enable applications to make use of the DBMS.

Many microcomputer products contribute shadows of most or all of the above functions. Few can be said to offer them in full-fledged form.

More than a toy?

The conclusion is not the one often drawn by mainframe users, namely, that microcomputer file products are toys of no serious interest. The fact is that most users, and this includes those tied to mainframes by terminals, do not require and do not want to look at a true DBMS. They want and require simple flat-file management of their data with quick and flexible form-building and retrieval capability. The simpler PC products meet their needs.

On the other hand, these same end users do not realize or appreciate the enormous cost and complexity of building a friendly, simple interface to a necessarily sophisticated DBMS that must manage and protect data across diverse machines, operating systems and physical sites.

Fortunately, the PC's ubiquity means it must become the focal point for these complex system products, both to meet the demands of end users who expect ease of use and MIS professionals who expect transparent connectivity to networks and mainframes.

The traditional programmer's DBMS of the '70s is gradually being replaced by transparent user interfaces to the DBMS and through the DBMS to the underlying file and operating system.

With SQL as the underlying data base engine, it is probable that tomorrow's users will plug in and play with a host of data front ends, ranging from Dbase on one end to Buttonware, Inc.'s PC File, Borland International's Reflex, Q&A and even 1-2-3 on the other end. For the Macintosh, Omnis 3 Plus from Blyth Software, Inc., Acius, Inc.'s Fourth Dimension and still another Dbase version from Ashton-Tate will play the same role.

Global strategic market

Five years ago, mainframe and minicomputer DBMS software companies laughed when asked if they had plans to enter the microcomputer arena. Three years ago, when the IBM Personal Computer AT was introduced, these companies began secretly laying their PC plans, and a few, most notably Oracle with PC-Oracle and Information Builders' PC-Focus, squeezed mainframe functionality into then 512K-byte packages and sallied forth to do initial battle with the new Dbase III.

Today, with Intel 80386-based machines and the imminent move to larger memory spaces, we can say with little exaggeration that every company developing a DBMS product at all is also developing one for microcomputers.

Actually, we can go even further. The PC is now and will remain the preeminent machine around which all strategic DBMS development will take place during the next five years. This does not mean departmental and mainframe DBMS will become irrelevant. Actually, their function as connectivity nodes and sophisticated power managers of input coming from PCs will also become more important.

Increasingly, all users will interact and work with DBMS products from the vantage point of the PC, whether that computer is viewed as a stand-alone appliance running a shareware program like PC-File or as an intelligent workstation node running under a network like Relational Technology's Ingres/Star.

This new phenomenon can also be understood as the transformation of all computer users into PC users. From a technical standpoint, this might seem like backward logic, since it would be at least as true to say that PCs are going to disappear and be absorbed into the intelligent-terminal category. But what is really important is that the perception and the functions, features and feel that have marked PC software will now become universal.

This direction can be seen in the fact that menu-driven interfaces, universally available on PC products, are now being retrofitted into mainframe-style products coming to the PC. Lotus ring menus are being adopted by Oracle's Professional Oracle, Informix's Informix-SQL and Relational Technology's PC-Ingres, to name a few. Smart, interactive Help systems and on-line tutorials, creative use of color and drastically rewritten documentation are another beneficial result of this phenomenon.

More important, downsized mainframe DBMS software is increasingly providing prompt-driven application development tools, screen painting utilities and other aids that permit the inexperienced user to prototype a working application without major hassle or expense. PC-Focus, in fact, now provides completely prompt-driven tools for reporting, file definition, maintenance of procedures and even interactive construction of windows for user applications.

Of course, there is a dirty little secret behind these new development priorities: The complexity level of serious microcomputer DBMS products is rising so fast that user-friendly interfaces and tools are not merely desirable as a design goal but absolutely required in order to attract customers.

This is as true, by the way, for mature, traditional microcomputer DBMS products as for the lumbering upstarts entering the market from the mainframe side. Dbase III Plus has become a highly complex and powerful programming language attached to a flat-file manager. This, in turn, drives a host of other third-party products aiming to simplify Dbase and make it more usable by novice and intermediate participants. Microrim's R:base System V boasts, not without reason, of its Application Express tools, which assists users in creation of applications. Still, this facility also serves to veil R:base's complex programming functionality.

The bottom line is that there is a tremendous collision taking place in the micro software marketplace. This collision is generated, on the one hand, by the efforts of former mainframe and traditional microcomputer developers to appeal to the sophisticated programmer or end user who wants the utmost in programmability while offering so-called "beginner's" aids.

On the other hand, all developers, even those that provide simplified file managers, want to constantly expand the usefulness of their products by adding features and functionality. In other words, the not-so-surprising reality is that every software developer would like every user for a customer.

While this collision highlights the challenges facing mainframe vendors that would like to enter

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Integrated approach for developers

BY REBEKAH WOLMAN

A health and safety professional at a manufacturing plant doesn't need to be Sherlock Holmes to pinpoint a "jump in upper torso and shoulder burns at Workstation 10 in the body shop" — at least not with the help of Humantech Incident Analysis and Trend Identification System (HIATIS).

Originally designed for General Motors Corp. and now used at a variety of plants, HIATIS, a software system for IBM Personal Computer ATs and compatibles, uses a series of data bases to track medical, maintenance, personnel and operational costs. This information is sent through a statistical program that formats and generates reports.

HIATIS was developed by Humantech, a Toronto-based industrial engineering firm, using Software Products International's Open Access II, an integrated package with a sophisticated data base management system capable of being used for application development.

HIATIS is the first of three management tools Humantech has developed with Open Access II. Perform, developed for Westinghouse Electric Corp., is a financial analysis program for comparing various resource allocation methods for facility and building projects. Facilities Analysis Strategic Planning and Tracking, still in development, will store resource allocation histories, perform historical analyses of operating, staffing, facilities and equipment costs and then perform five-year projections based on that information.

Brain power

All of these packages reflect Humantech's conviction that "data means nothing until you process it in your own head," says Ted Stout, Humantech's director of operations and one of its principals. "The client has to have full ownership of the process," he explains, adding that it only happens if "you develop a program that you can get the majority of people to use."

That is where Open Access II comes in. "We don't look at it as an integrated package but as an applications tool for customizing software to client applications," Stout says. "We can't be turned on by the latest thing, by the nicest package. We have to look practically at the software — how it's going to be supported and how it's going to work for our clients."

Stout gives a nod to the tool's powerful on-screen menu capabilities, but with Humantech's expertise in ergonomics, he says, it has done a lot of user-interface design and designs its own menus. It has also overcome Open Access II's "one slight problem" — a hard-to-follow manual — by writing its own.

"We like Open Access because it has a statistical package in it," Stout says. "And in the spreadsheet, the capabilities of the attributes and the fields reflect a tremendous amount of flexibility. Our programmers were originally opposed to getting involved with an applications program, but they've ended up being quite impressed with Open Access as a tool."

Formatting flexibility

All these features are attractive from a development point of view, but the most attractive feature — formatting flexibility — is the one that clients experience most directly. "Open Access gives us great latitude in how to format finished data," Stout says. "And we really like the fact that we can take data from the data base, throw it into the spreadsheet, calculate it, format it and print it out — all with one command."

The data base itself has a similar capability, which makes it especially well suited to Humantech's needs. The original version of HIATIS was developed for a combination of data base, statistical analysis and word processing software. "We wrote batch files for producing reports," Stout says, "but every time you wanted a report, you had to go into the word processing software to reformat. People said they didn't have time to do that, so there was automatically a barrier to the use of the thing. With Open Access, we can get around those barriers."

Along with capitalizing on the formatting flexibility of Open Access II, Humantech's developers have done their part to make each of the tools easy to use. "We've designed a Turbo Pascal shell around the software to help people get into it," Stout explains. "We've included lots of prompting, and we've designed a sort of on-line manual that supports the whole process."

With its three Open Access-based systems, Humantech indicates it is trying to avoid situations in which, according to Stout, "people overuse tools to the degree where they're not productive anymore." •

Wolman is a free-lance writer based in Boston.

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the microcomputer marketplace, those facing microcomputer developers are probably even more severe in the long run.

It is one thing to downsize a heavy-duty product that handles large-machine operating systems and networking requirements to a far simpler PC operating architecture. It is quite another to stretch the architecture of a PC product upward into the regions of departmental and mainframe machines.

Experience suggests that companies such as Ashton-Tate and Microrim might do well to form strategic partnerships with corporations that have had long experience in those areas. Alan Simpson, an author and consultant who specializes in DBMS, says he feels Ashton-Tate "will probably lose its status as a heavy hitter over the next few years unless major changes are made.

"In a sense," he continues, "considering the changes under way, they are now back at square one."

Microsoft started on this road by purchasing rights from Sybase, Inc. to the technology pioneered in the Unix sphere. Lotus, as well, is now in partnership with Gupta Technologies, Inc., a company run by people who assisted in the development of the original Oracle products.

Companies like Oracle and Relational Technology have, on the other hand, an edge in connectivity that will become very important in the near future. Atre says she is convinced that "these companies have a big advantage, because their minicomputer customers already have every confidence that they can handle the emerging connectivity standards for microcomputers."

On the other hand, she notes wryly, "Ten years ago, the mainframe companies vowed to put the minicomputer vendors out of business, and now the minicomputer vendors are promising to put microcomputer vendors out of business. It won't happen."

The OS/2 invasion

If Paul Revere had been asked to announce the coming of OS/2, he could have ridden to California and back before its arrival. Still, it is coming, and it is likely to have a divisive impact on both the development and delivery of microcomputer DBMS products.

OS/2 will have this effect because many users will wait until an application appears that demands OS/2 usage before they upgrade to it. This means DBMS developers will need to decide whether to target their existing users with new functionality (under Microsoft's MS-DOS 3.X or MS-DOS running as a task under Unix) or entice these users to new packages on OS/2. Unquestionably, OS/2 on 386 machines will ultimately generate applications of tremendous power and flexibility that do attract users but, in the short run, say until 1990, these two different DBMS markets will coexist in varying degrees of cooperation and confrontation.

The two key elements of OS/2 for DBMS developers are the Presentation Manager and the coming IBM provision of an SQL engine to OS/2 Extended Edition. The Presentation Manager will force many developers into a terrible dilemma: Do they redesign and rewrite enormous sections of their code in order to gain the benefits of a common, standardized graphical interface or do they retain their unique user interfaces and risk becoming isolated?

Dave Feldstein, vice-president of Information Builders, has presided over the development of an increasingly slick front end to PC-Focus and feels the Presentation Manager has yet to demonstrate its right to become the sole model for user interfaces. "We'll support Windows, of course," Feldstein says, "but we are working toward a world that includes image, CD-ROM and artificial intelligence applications; a world that, by the early 1990s, will require multiple interface models."

Of course, whether Microsoft's Windows is a good interface is another question altogether. As with the Mac, standardization is shortly to become a fact of life, and the wise will adjust accordingly.

Presentation Manager-based applications with their easy-to-use graphical interface will gain a strong differentiating point in the early part of the OS/2 era. This may even provide the first argument for users to come along to the entirely new product. The real question for developers ought to be: Do I write my product using Windows as the primary interface, or should I provide other interfaces under a Presentation Manager front end?

IBM's provision of an SQL-based engine to OS/2 poses an even thornier question, particularly since "SQL" has become the magic word whose repeated utterance is supposed to propel everyone to success in the next 10 years.

"Data base facilities are now becoming closely integrated with the operating system itself," comments the Gartner Group's Kirwin. "This argues that vendors who are not 100% compatible with these facilities could push their users not only into transparency problems but into serious performance bottlenecks."

Of course, IBM's own motives are understandable, even exemplary. IBM, remember, launched the relational research that became SQL — one of the few times that the company has led the technological band. It should hardly be surprising that IBM is particularly jealous to control the course of its own technology.

As Atre comments, "SQL and DB2 are their own horse, and everything is going

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1:30-4:30 p.m.

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This session examines where CD-ROM fits in the MIS chain. You will become familiar with CD-ROM's suitability for different types of databases, including financial and other numerical bases, with attention to record length, speed, frequency of access, update scheduling, security/integration and backup requirements. Discussions will also include networking of drives, personal computers and other workstations/mainframes. **For:** MIS-experienced and systems/database management professionals.

T-8 Using CD-ROM in Expert Systems
The massive storage potential in CD-ROM, along with its low cost and reliability, make possible advanced expert or artificial intelligence applications ranging from emergency medicine to point-of-sales retail. This session will introduce some of the applications and the problems providers face with CD-ROM equipment in public or severe environments. **For:** Professionals who work with intelligent, educational, or decision-support systems and who plan to use CD-ROM technologies.

to ride them."

With IBM's DB2 running on mainframes and SQL/DS running almost everywhere else, IBM must provide a compatible SQL component with OS/2 in order to deliver the application portability and transparency that has been promised by SAA. If IBM can deliver a top-notch SQL engine with OS/2, a lot of the development work now being carried on may become moot.

To be sure, many people have become rich betting against IBM's developing a truly superior software product, and the same may happen this time. A very few companies — including Oracle, Relational Technology, Gupta Technologies and Informix — may be able to sell customers on "their" SQL instead of "IBM's" SQL.

DESPITE ITS proponents, SQL is not particularly well-suited as a language for end users. It is line- rather than form-driven, has minimal on-board facilities for application building and still consumes a high degree of computational resource.

"Companies like Informix are well positioned here," author Simpson says, "since they can easily build things around their existing SQL engine."

However, most companies would probably be wise to take the data base engine for granted and provide the rest of the DBMS and application environment for reading and writing to SQL. After all, it is questionable as to whether SQL is rightly positioned as an end-user product anyway. IBM is probably positioning it just right as a set of services running under and in tight coupling with OS/2.

Kirwin says if he were managing strategy for a company like Oracle, "I'd be compliant with IBM, without question. But," he adds, "Oracle Network Station works very nicely and can flexibly provide mid-frame and mainframe connectivity. More important, Oracle can add value in areas where IBM won't by providing quality connectivity to the Digital Equipment Corp. VAX and other vendors." Adding value is, as always, the real key — not only to survival but also to differentiation.

In any case, SQL is not quite as standard as many people are saying. It resembles the C language in this regard. It features a stable kernel and a high degree of portability. Subtle and important differences abound, however, and these could prove particularly damaging to products competing directly against IBM's SQL, which will, as always, be the de facto standard.

The SQL engine

SQL emerged from the labs of IBM in the late 1970s as the successor to System R and quickly established itself as the emerging standard for relational data base products. Until recently, however, SQL found its home in the mainframe and departmental computing world and especially with IBM's DB2 and SQL/DS systems. Even there, the decade that has already been required to launch relational products should be a tip-off that something more than conservatism has blocked the revolution.

Even its name, Atre says, suggests problems. "I'm still asking someone to tell me why it is called SQL," she says. "It's not structured, it doesn't provide a complete query package, and it certainly isn't an application language."

So there have been very good reasons for the long delay in SQL's adoption. Despite its proponents, SQL is not particularly well-suited as a language for end users. It is line- rather than form-driven, has minimal on-board facilities for application building and still consumes a high degree of computational resource.

Of course, the latter constraint is disappearing, highlighting SQL's prime design strength: It is well-suited to serve as a data base engine surrounded by application building environments. It is no accident that SQL is coming into its own on microcomputers at the same time that these machines are being used as nodes in local-area networks and as intelligent terminals interacting with the mainframe.

None of the above is meant to imply that SQL is a minor or passing phase. Provision of SQL services will become a given throughout the PC universe. At the very least, this means DBMS products will provide a record read-write interface for access to SQL data bases. The user will not necessarily need to know any SQL, since the product will assume responsibility for parsing SQL into the custom product interface.

According to Atre, "SQL will serve as the kernel around which many other facilities will be developed." At most, the user will employ SQL directly in a DBMS product that combines the SQL data base engine with access to application development facilities.

It is too bad that the SQL furor is obscuring other models for structuring and retrieving data. While the relational model does indeed simplify data management and design for programmers, hierarchical and networked data models are more appropriate for many applications.

Relational data bases, especially with their natural and elegant links to AI and logic programming, will rightfully take

Continued on next page

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CW2

PRODUCT FACE-OFF
Acius, Blyth cut to the core of Macintosh DBMS capability

While there are many superb file managers for Apple Computer, Inc.'s Macintosh, few serious data base management systems have appeared for the machine. This situation, however, is about to change.

Ashtoo-Tate is finally readying its notoriously delayed version of Dbase for the Mac, but it may be a case of too little too late. Rumors of bugginess and design trade-offs aside, the timing of Dbase's release is unfortunate because it has been superseded by the release of another blockbuster product — Fourth Dimension from Acius, Inc.

Fourth Dimension now joins Blyth Software, Inc.'s Omnis 3 Plus in the heavyweight DBMS division for the Macintosh. Whether or not you use the Macintosh, these two products are worth studying because they will both exert, for different reasons, a significant impact on personal computer products during the next two years.

Omnis 3 Plus is a thoroughly debugged, high-performance product that has been available on the Mac for more than two years. The designers behind it have been writing data base software for several years. Omnis 3 Plus is available in single- and multiuser versions.

The flat file is the basic construct within Omnis 3 Plus, but direct support is provided for connecting each file to as many as 11 other files in order to fluently process hierarchical and networked data designs. Pointer management between connected files is handled automatically within the DBMS.

Beginning users can build simple applications by pointing and picking from Macintosh menus and following the control instructions set by on-screen buttons and prompts.

Omnis 3 Plus makes much of the Macintosh interface available to the application builder. While the supplied programming language includes a fairly rich range of control constructs and functions, the product intentionally favors a rather spare approach to application creation. Users iteratively define sequences by choosing combinations of available commands from pop-up menus. Sequences are then assigned either to on-screen mouse buttons or to options on pull-down menus that behave identically to regular Macintosh menus.

Control flow is permitted within sequences, such as if-else or repeat-until. Sequences can be nested, and external sequences can be called from an executing sequence, so it is certainly possible to create turnkey applications with a real Macintosh look. At the same time, nonprogrammers can apply a Lotus Development Corp. 1-2-3 macro programming style to their work without much concern about technical details.

The impact of Omnis 3 Plus is more likely to appear on the PC than the Mac, however. A look-alike, work-alike version is being readied for imminent release under Microsoft Corp.'s Windows. Omnis 3 Plus will thus become one of the first DBMS products to provide users with a fully windowed, mouse-driven style that benefits from the standardization of the Windows interface. When this happens, users will also be able to easily trade applications and data with such products as the Macintosh II.

> THIRD-PARTY vendors were horrified at the thought of Apple putting its reputation behind an already formidable DBMS product.

Celestial event

While Omnis 3 Plus has a lot of benefits, the release of Acius's Fourth Dimension could eclipse it and several other Macintosh DBMS products.

Apple purchased the rights to Fourth Dimension from its French developers and, not surprisingly, intended to direct-market it. Also unsurprisingly, third-party vendors were horrified at the thought of Apple putting its reputation behind an already formidable DBMS product. Finally, a patchwork solution was found — Acius, a start-up, was formed, and Guy Kawasaki, Apple's chief software evangelist, left Apple to run the company.

Fourth Dimension's only problem is an embarrassment of riches. For those with Mac-like sensibilities, it is enough to say that the product requires every single page of its more than 1,000 pages of documentation. Fortunately, the user manual is written and presented beautifully.

The Fourth Dimension user works within three environments: the design environment, where files and layouts are defined; the user environment, where procedures and tasks are executed and where noncustomized applications can be run; and the custom environment, which can be fine-tuned by application developers to present a thoroughly individual appearance and feel.

The most complex of these environments is the design environment, which includes five editors for designing file structure; creating input, output and dialogue layouts; writing procedures; creating custom menus; and defining passwords.

Flat-file approach

Like Omnis 3 Plus, Fourth Dimension favors a flat-file approach to data management. This is supplemented by optional relational links between files and the capability of defining hierarchical structures through the use of subfiles tied to a subfile field within the containing file.

Fourth Dimension shines in the Macdraw-like, object-oriented graphical support that is provided. Color support for the Macintosh II is already available. But Fourth Dimension is unbeatable in the nearly total support it provides the programmer.

Vast portions of the Macintosh toolbox are accessible, and a host of standardized data base subroutines for functions such as adding or deleting records are already available. It is easy to add user-defined subroutines to the total library and nearly as easy to incorporate external functions coded in traditional programming languages. Almost anything that can be done in Pascal or C can be done in Fourth Dimension, with the added benefit that the user is provided with a graphical DBMS environment within which to work.

Although undeniably complex, Fourth Dimension, like Omnis 3 Plus, allows simple applications to be created without forcing beginners into the programming facilities.

Like Microsoft's Excel, which caused power users of PC spreadsheets to consider the Mac for the first time, Fourth Dimension will trigger reexamination of the Macintosh as a vehicle for serious data base work. PC developers who are still agonizing over their own plans for fourth-generation languages or for building next-generation interfaces with Windows should study Fourth Dimension carefully. If they're lucky, it won't be ported to the PC.

RUSSELL LIPTON

Gold rush

FROM PREVIOUS PAGE

the lion's share of the DBMS market, but they ought not, and indeed will not, ultimately eclipse nonrelational offerings.

Dispelling myth of SQL

More serious with SQL is the myth that it is an end-user application vehicle. In fact, when users buy an SQL product, they are actually buying into a particular implementation of a fourth-generation language environment. Every SQL vendor offers, usually explicitly, a fourth-generation language facility to compensate for SQL's weaknesses in that area. In a sense, the SQL portion, especially as time goes by, will be the least important part of these products.

Cathryn Barley, information center manager for Best Products Co., a nationwide retailer, speaks for many when she says, "If we find SQL to be truly user-friendly, we will move toward it. Right now, we have a large staff, with good Dbase skills and lots of stand-alone applications with adequate performance and features."

This suggests that vendors providing a top-notch interface for applications — so long as they can read and write SQL data bases — will ultimately prevail in the microcomputer DBMS marketplace. From sheer inertia of the customer base alone, this could yet save Ashton-Tate and Dbase from obsolescence. Likewise, if Lotus or Microsoft can translate their experience with their own interfaces into the DBMS arena, their customers may follow happily.

It should not be forgotten that many serious microcomputer users have put in a lot of productive hours with these products and companies and have developed strong loyalties.

Patrick Rooney, manager of information systems for the Baseball Hall of Fame in Cooperstown, N.Y., has painstakingly developed an entire accounting system with Dbase and is not going to discard it quickly. "Dbase III Plus is very powerful and, we think, easy to use," Rooney says. "I'm certainly looking at other products, but we are quite satisfied with the results we've already obtained."

Finally, this provides a fresh opportunity for mainframe vendors that have long specialized in that arena. Information Builders, which, for the first time, is selling Focus as an application environment for DB2 without inclusion of the Focus data base, is a prime example. Informix recently provided a full-blown fourth-generation language — Informix-4GL — to its customers to complement its otherwise stand-alone SQL product.

A large number of interesting technologies are already appearing in leading-edge products, and it is a safe bet that at least some of them will be mainstream products within five years.

The most significant trend will be the tight coupling of expert system products to DBMS products. Note that while expert system products are already old news, the coupling we speak of will be new news. Arity Corp., for instance, is dedicated to providing compilers and tools for Prolog programming but has already released a Prolog SQL tool kit that enables programmers to blend relational DBMS within logic programming.

The Japanese Fifth Generation Project has long envisioned a merger of logic programming with relational data bases. Ultimately, this means data bases will provide functionality that enables users to handle additional data types, such as lists, rules, frames and procedures, alongside traditional data types.

Expert system trends also imply that new methods of querying data bases will appear based around AI technology. Q&A's natural language capability, while hardly revolutionary, nonetheless furnishes an early example of this trend. Object-oriented programming is already giving birth to design for object-oriented data bases, an effort that Ingres's designers are pursuing at full speed.

This kind of work shows some promise of providing the next-step technology to substantially extend or even replace relational data base technology within a decade.

Enter CD-ROM

Another trend centers on CD-ROM technology. Assuming CD-ROM will penetrate the industry — a safe, though by no means certain, assumption — DBMS vendors will find themselves challenged by the need to provide qualitatively more sophisticated navigation facilities through multimedia data bases measured in the hundreds of megabytes. Text handling has never been a strong point for DBMS to begin with, and it will be dramatically complicated by the merging of text with image and audio in CD-ROM.

The still primitive navigation tools of today's emerging hypertext products (for example, Guide from Owl International, Inc. for both the IBM PC and the Macintosh) are candidates for transformation and absorption into DBMS products. While Guide is not a data base product today, its design trajectory should carry it into that realm. Guide currently is being used to create highly interactive documentation and textual retrieval applications.

Application generation will also see tremendous leaps forward in the next five years. In author Simpson's view, "Trends like SQL are not as important,

In the data base language contest, SQL places first on popular vote

BY RICHARD FINKELSTEIN

The importance of Structured Query Language (SQL) lies not in its innate power and simplicity of construction but in its emergence as the standard language for data base management.

In February, the American National Standards Institute released its specifications for a standard SQL. In March, IBM officially put its stamp on SQL by declaring it the data base language for its Systems Application Architecture (SAA).

Other languages have competed with SQL for the position of standard data base language. One is Relational Technology, Inc.'s Quel. Many industry experts feel Quel is the better product, but SQL has, nonetheless, emerged as the victor because of strong industry support.

ALL TOLD, the industry is currently spending millions of dollars on SQL and related product research and development, which ensures the language's permanence. Although the total effect of SQL on the micro world is still unclear, it can no longer be disputed that it will be the standard.

SQL's primary attraction is the promise of standardization, which means substantial economic benefits for users. These benefits are derived from increased portability of applications, reduced training costs, better communication between data processing and end-user personnel, increased connectivity of information and greater longevity of applications.

Edging toward portability

SQL is technically a data sublanguage. It can be used interactively by end users or embedded in an application development system. While SQL can be used within procedural languages such as Cobol and PL/I, most vendors provide nonprocedural application development tools that utilize the full power of SQL.

Oracle Corp. provides SQL Forms, while Relational Technology includes Application-By-Forms within Ingres. Informix Software, Inc. offers Informix-4GL. Sybase from Sybase, Inc. and XDB from Software Systems Technology, Inc. both include advanced, nonprocedural application generators with embedded SQL. All of these products are available on micro and minicomputer platforms.

Since each vendor has its own application development tool set, SQL does not ensure total portability of applications. It does, however, provide a start in that direction. Most vendors are supporting IBM's version of SQL and are trying to mimic its language precompilers and program error handling routines.

Even with standard precompilers, it would also be useful to have standardized nonprocedural application development tools and end-user interfaces. IBM has already announced that its Cross-System Product (CSP) and Query-Management Facility (QMF) will be part of SAA. CSP is IBM's application generator that can be used to develop DB2 applications.

QMF is IBM's end-user interface that allows users to manipulate SQL data bases using SQL commands or Query-By-Example forms. A runtime version of CSP is currently available on the IBM Personal Computer, and IBM has indicated its new operating system, OS/2 Extended Edition, will include a QMF-like front end.

Similarly, Oracle has announced a QMF-like front end, which it calls QMX. IBM will also introduce a nonprocedural application development tool with OS/2 Extended Edition, which may be copied by other vendors.

Other vendors will compete with IBM in the applications development arena. Oracle, Relational Technology, Sybase and Informix are likely to introduce interfaces for their tool sets to DB2 and SQL/DS. Applied Data Research, Inc. recently purchased a license to XDB and will undoubtedly make use of XDB's form-generation system on future products.

All of these vendors offer nonprocedural application development products that are substantially more productive than their mainframe counterparts, and as these products are moved to the mainframe, we should see increased applications portability.

SQL is also being used in non-data base products such as spreadsheets and graphics packages. Lotus Development Corp. has announced a strategic relationship with IBM that will link 1-2-3/M to DB2 on mainframes. Lotus has also announced data base-oriented packages based on SQL on the micro that will probably be similarly linked to 1-2-3.

Signs of diversification

SQL is meant to be used by both end users and DP professionals. Since end users and programmers will be speaking the same language, there will be less confusion when these two groups communicate with one another. And the fact that SQL can be used interactively, as well as within application programs, means that an organization only needs to train their end-user and DP personnel in one language.

SQL also supports the growing demand to link data bases within and between local-area networks (LAN), wide-area networks and micros, minis and mainframes. Gupta Technologies, Inc. currently provides an Advanced Program-to-Program Communications gateway between its data base server, SQLbase and DB2 using CICS. Since SQLbase is based on the requestor/server data base model, users can transparently access multiple servers on a LAN or mainframe system such as DB2. Ingres and Oracle also provide SQL-based distributed data base query capabilities.

Although IBM's SQL data base server for OS/2 Extended Edition could be two or more years away, this should not impede the development process, since SQL vendors will build bridges from their DBMS and DBMS servers to IBM's via SQL gateways. This capability will allow an organization to begin planning and implementing LAN data base systems without cutting itself off from future product developments or exposing itself to excessive conversion costs.

All told, the industry is currently spending millions of dollars on SQL and related product research and development, which ensures the language's permanence. Although the total effect of SQL on the micro world is still unclear, IBM and Ashton-Tate have announced micro DBMSs, and Lotus and Microsoft have definite intentions in this field. Oracle and Informix both appeared on a recent *Business Week* list of fastest growing corporations, and every SQL vendor is experiencing unprecedented growth. •

Finkelstein is vice-president, Midwest region, of the Codd and Date Consulting Group. He also publishes "SQL Review," a quarterly newsletter.

Proof of productivity is found in the quality of the decisions made

BY CHANNING PRESTON

Too much emphasis is being placed on data base management systems' efficiency. Performance issues merely scratch the surface of potential data base use. A more difficult issue to address is whether these data bases are used productively.

Productivity can be examined from several points of view. Primarily, users hear of the vast increase in programmer productivity, as well as better use of machine resources through operational ease of use and improved performance.

However, from a business perspective, data base productivity is measured by decision support, whether data bases are being used to solve business problems or make better business decisions.

In organizations using data bases, there are three types of users: the active, the passive and the deferred user. Each type has recognizable characteristics, and each uses a data base in a different way.

- The active user is typically at the line level and uses the data base in the most traditional fashion, in support of transaction processing.
- The passive user has little actual contact with the data base but uses the information accessible through it to make day-to-day decisions.
- The deferred user is the most difficult to recognize and can be characterized as a "corporate guerrilla," using the data base to maintain his corporate position through strategic thinking.

It is the deferred user who stretches the limits of data base capacity by using the information provided by the other two user types. As business issues arise that cannot be answered easily, it is the deferred user who will seek out new sources of information or use existing information in new ways.

This process can be termed the "pressures and vents" phenomenon: As pressure for new information builds, new routes, or vents, for obtaining that information will be found. In a well-controlled data base environment, these vents will result in a more robust environment from which to draw new information to perform even more sophisticated simulations and answer harder business questions.

How does the deferred user make use of data base systems to gain maximum productivity from the information they can provide?

As business decisions are formulated, he will use the data base to model all aspects of the decision, gathering as much information as possible. Then, the decision-making process can be simulated and, most important, evaluated.

Here is where data base productivity really lies. If decisions

Continued on page S10

Preston is data base administrator for Advanced Systems, Inc., a company specializing in training products and services, in Arlington Heights, Ill.

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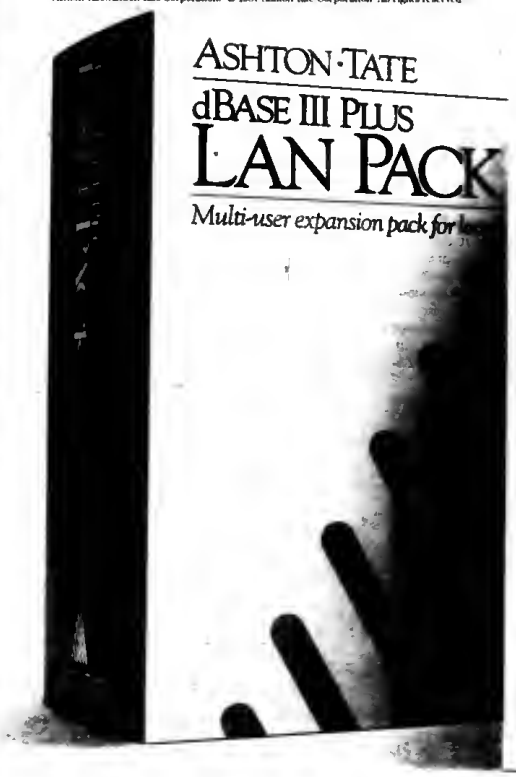

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ultimately, as the continued development of fourth-generation language products. Tools that reduce or eliminate the need for coding will have a much greater impact on the market."

Again, the Macintosh is leading the way in this area, both with data base products like Fourth Dimension and Omnis 3 Plus and with special programming tools like Mainstay's Visual Interactive Programming (VIP).

VIP is particularly revolutionary, since it enables users to construct error-limited programs by picking and choosing from graphical objects that are automatically combined by VIP to produce executable programs.

The problem with the Macintosh has never been lack of innovation but rather lack of clout in the corporate office. The desktop publishing boom changed this to some degree, but Gartner'a Kirwin says be believes the new generation of Macintoshes will open more doors.

"Without question," be says, "the Macintosh is now going to make very significant inroads into the corporate market. We predict that Apple will appear on many more corporate-supported lists over the next 12 months."

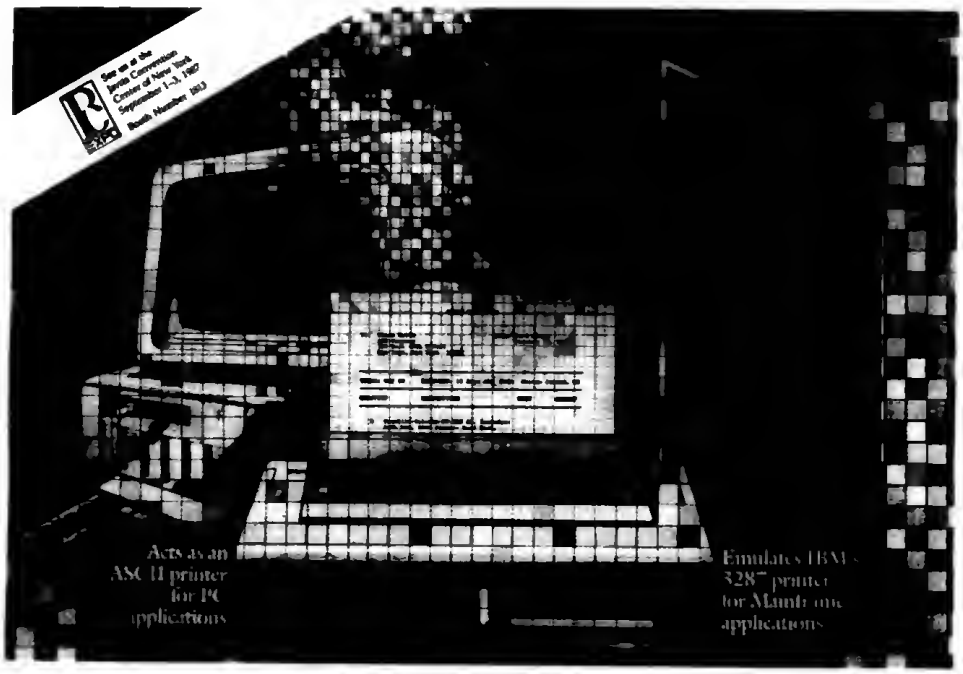
By synthesizing the above trends, it is not too difficult to arrive at a highly probably scenario for 1992. OS/2 and SQL will have long since stabilized as an operating system and data base engine platform.

Around this platform, a host of vendors will have constructed super-powerful DBMS systems mediated by a Presentation Manager or Macintosh interface that enables users to variously pick and choose from on-screen objects or descend into fourth-generation languages to construct applications that access the entire PC machine.

Meanwhile, users will be poised for full appropriation of developments that will take us to 1997. These developments will incorporate hyper-data bases in CD-ROM that merge textual and graphical data structures using an extended relational model that is mediated by "expert assistants."

These software agents will automatically optimize performance as well as consult with the user to recommend query approaches to data based on observed user behavior.

Just as SQL will have become a largely invisible system data base engine, the Presentation Manager will probably become a very high-level toolbox from which multiple, customized user interfaces will be developed to handle an ever-expanding set of customer requirements. ■



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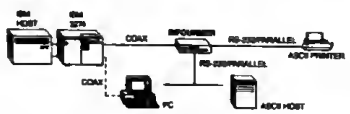
Meet the *Infourmer* from 4G Data Systems. It's a printer adapter with two important character traits. One, it attaches directly to IBM PCs for ASCII printer applications; and two, it emulates the IBM 3287 printer for mainframe applications.



Just think of the possibilities. Now you can access your company's IBM host, preview and work with the data on your desktop PC, and get your printout on any popular, low cost ASCII printer at any remote location. Conversely, you can network the IBM 3287 system without an expensive IBM 3287 printer. Or to put it simply, you can now integrate the same ASCII printer for both PC and IBM or ASCII host applications.

The big advantage of the Infourmer is that it makes more of your ASCII printer capability. Much more. You get more type fonts, faster print rates, higher quality, and quieter operation. And no more waiting for printouts from the basement computer room. You get your hard copy where and when you need it. All for about one fourth of what it costs for an IBM printer.

As specialists in micro-to-mainframe link communications, the Infourmer is precisely the kind of product you would expect from 4G Data Systems. It's our printer adapter with the split personality that brings it all together for you. For more information, call us toll-free **1-800-367-4539.** In New York, call **1-800-223-4539.**

4G DATA SYSTEMS inc

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Productivity

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can be modeled and evaluated, the result should be better decisions, not just more of them. If this modeling can occur before the decision is made, catastrophes should be avoidable.

This is the optimum in decision modeling. Even if complete information is not available for use in the simulation, data bases can be used to gather information for after-the-fact evaluation of decision results. In this way, information bases can be built that can eventually be used in the simulation process.

A classic example of decision simulation can be found in product development. By gathering information about a product and about its market, the potential response can be estimated and a decision made as to whether the product should be developed.

Of course, the information accuracy and the reasonableness of the assumptions used in the simulation must be factored into the model or the simulation may not approach reality. When the resulta of early decision simulations are applied, this process can be refined to increase the accuracy of the simulation, making the simulation a cyclical, dynamic process.

So there are two factors to the decision-modeling process — having the information available to build a model and simulate business decisions and gathering the indicators to evaluate that decision, which will facilitate future simulations. Organizations that use data bases in this fashion exhibit a much higher degree of sophistication than those that use data bases simply to store and access data. ■

Microcomputer and small-system DBMS

COMPANY	PRODUCT	OPERATING SYSTEMS SUPPORTED	HARDWARE SUPPORTED	MINIMUM MEMORY REQUIRED (IN BYTES)	NUMBER AND KIND OF DISKS REQUIRED	MULTIUSER CAPABILITY	SUPPORTS LAN USAGE	MENU DRIVEN	QUERY LANGUAGE INCLUDED	PROGRAMMING LANGUAGES SUPPORTED	FULL DATA TRANSFER WITH OTHER SOFTWARE	MAXIMUM FIELD SIZE (IN CHARACTERS)	MAXIMUM NUMBER OF FIELDS PER RECORD	MAXIMUM NUMBER OF RECORDS PER FILE	SECURITY PROVISIONS	PRICE
Acius, Inc. (408) 253-4444	**Fourth Dimension**	**Macintosh operating system**	**Macintosh**	**1M**	**2 800K floppies, hard drive recommended**	**Yes**	**Yes**	**Yes**	**Yes**	**Proprietary**	**Any ASCII file**	**32,767**	**511**	**18 million**	**Password protection**	**$695 (per copy)**
Advanced Data Institute of America, Inc. (916) 381-8534	Aladin	MS-DOS, Apple DOS	IBM PC, XT, AT, PS/2 and compatibles, Apple II series	192K (IBM version), 64K (Apple version)	2 floppies or 1 floppy, 1 hard disk	No	No	Yes	Yes	Pascal	Any ASCII file	32	512	65,535	Password protection, user-access security	$795 (IBM version), $595 (Apple version) (per copy)
Advanced Microsolutions (415) 365-9880	**DBmagic**	**Basic**	**HP 9000 or Vectra PC**	**1M**	**1 double-sided floppy**	**Yes**	**Yes**	**Yes**	**Optional**	**Basic**	**Proprietary**	**32,000**	**32,000**	**Limited by disk space only**	**Finger-printed disk, security modules**	**$1,495 (for first copy)**
Airs, Inc. (301) 454-2022	Marcon	MS-DOS	IBM PC, XT, AT and compatibles	640K	1 hard disk	Yes	Yes	Yes	Yes	None	Any ASCII file	Limited by disk space only	80 recommended	Limited by disk space only	Field security, function-level security, password protection	$895 (per copy)
Alpha Software Corp. (617) 229-2924	**Alpha/three**	**MS-DOS**	**IBM PC, XT, AT, PS/2 and compatibles**	**320K**	**8 floppies**	**No**	**No**	**Yes**	**No**	**None**	**Any ASCII, DIF, Sylk file**	**4,000**	**128**	**65,536**	**None**	**$395 (per copy)**
American Planning Corp. (703) 751-2574	Boss	MS-DOS, PC-DOS, Xenix 5, CP/M 86	IBM PC, XT, AT and compatibles, hardware compatible with Intel 8088, 8086, 80186, 80386 machines	320K	2 floppies	Yes	Yes	Yes	Yes	Basic, C language, assembler	Any ASCII file	255	255	2 billion	Data encryption, password protection, record locking	$990 (per copy), $1,895 (multiuser)
Analytical Software, Inc. (214) 340-3564	**The Executive Assistant**	**MS-DOS**	**IBM PC, XT, AT, PS/2 and compatibles**	**128K**	**1 double-sided floppy**	**No**	**No**	**Yes**	**No**	**None**	**Any ASCII file**	**25**	**8**	**225**	**None**	**$150 (per copy)**
Anan Software (418) 885-4851	Paradox	MS-DOS	IBM PC, XT, AT and compatibles, Compaq Plus, Deskpro and compatibles	512K	2 floppies	Yes	Yes	Yes	Yes	Proprietary	1-2-3, Symphony, Dbase II, III, any ASCII, DIF, PFS file	255	255	65,000 up to 2 billion depending on version	Password protection, record locking, protection generation	$495-$725 (per copy depending on version)
Applied Software Technology (408) 370-2662	**Versaform XL**	**MS-DOS**	**IBM PC, XT, AT, PS/2 and compatibles**	**512K**	**2 floppies or 1 floppy, 1 hard disk**	**No**	**No**	**Yes**	**Yes**	**Pascal**	**Any ASCII, text file**	**158**	**100**	**Limited by disk space only**	**None**	**$159 (per copy)**
Aquarius Enterprises (609) 693-0513	AE data base development program	MS-DOS, CP/M	IBM PC, XT, AT and compatibles	384K	2 floppies	Yes	Yes	Yes	Yes	Assembler	Dbase, 1-2-3, any ASCII file	—	—	—	Password protection	$695 (per copy)
ASAP, Inc. (408) 476-3935	**Universal base utx**	**MS-DOS, PC-DOS**	**IBM PC, XT, AT PS/2 and compatibles**	**256K**	**1 hard disk with 1M-byte disk space**	**No**	**No**	**Yes**	**Yes**	**None**	**Any ASCII, DIF file**	**80**	**255**	**Limited by disk space only**	**Password protection**	**$395 (per copy)**
Ashton-Tate (213) 329-8000	Dbase III Plus	PC-DOS	IBM PC, XT, AT and compatibles	256K	2 floppies	Yes	Yes	No	No	Dbase, C language, Pascal	Any ASCII, Sylk, PFS file	255	128	Limited by disk space only	Protect utility	$695 (per copy)
Automata Design Associates (215) 646-4894	**ADA Prolog**	**MS-DOS, PC-DOS, Xenix, Unix System V**	**IBM PC, XT, AT and compatibles, 80386 machines**	**640K**	**1 hard disk**	**Yes**	**No**	**No**	**Yes**	**Prolog**	**No**	**Limited by disk space only**	**Limited by disk space only**	**Limited by disk space only**	**None**	**$100-$400 (per copy depending on hardware)**
AV Systems Corp. (805) 569-1618	Database Builder	Apple DOS 3.3	Apple II series and compatibles	48K	1 floppy	No	No	Yes	NA	Basic	No	256	18	Depends on configuration	None	$9.95 (per copy)
Blyth Software, Inc. (415) 871-0222	**Omnis 3 Plus**	**Macintosh operating system**	**All Macintosh computers**	**512K**	**3 floppies, 1 hard drive recommended**	**Yes**	**Yes**	**Yes**	**Yes**	**Proprietary**	**Any DIF, Sylk, ASCII file**	**79**	**1,440**	**Limited by disk space only**	**Password security, library encryption**	**$495 (per copy, single user)**
Business Tools, Inc. (206) 644-2015	TAS-Plus	MS-DOS	IBM PC, XT, AT, PS/2 and compatibles	384K	2 floppies or 1 floppy, 1 hard disk	Yes	Yes	Yes	Proprietary	None	Any ASCII file	255	10,254	65,535 or 16,776,960	None	$69 or $199 (per user, single copy, depending on version)
Buttonware, Inc. (206) 454-0479	**PC File Plus**	**MS-DOS, PC-DOS**	**IBM PC, XT, AT and compatibles**	**384K**	**2 double-sided hard disks**	**No**	**No**	**Yes**	**No**	**Basic, Fortran, Pascal, C language, assembler**	**Dbase II and III, Wordperfect, Wordstar, 1-2-3, Peach Text, Microsoft Word, proprietary**	**1,865**	**72**	**65,533**	**Password protection**	**$69.95 (per copy)**
Cincom Systems, Inc. (800) 543-3010	Ultra	VAX/VMS	All Microvax	1M	Varies with size of data base	Yes	Yes	Yes	Yes	Cobol, Fortran, Basic, proprietary	RMS files	4,000	Limited by disk space only	Limited by disk space only	Password protection, common data directory security	$20,000 (per copy)
Computers Anywhere, Inc. (800) 383-WORD	**Base**	**MS-DOS, PC-DOS**	**IBM PC, XT, AT and compatibles**	**64K**	**1 hard disk, 1 floppy**	**No**	**No**	**Yes**	**No**	**Fortran, proprietary**	**Any ASCII file**	**132**	**2,048**	**Limited by disk space only**	**Password protection**	**$695 (per copy)**
Compuware Corp. (313) 540-2396	Powerbase	MS-DOS, OS/2	IBM PC, XT, AT, PS/2 and compatibles	384K	2 double-sided floppies or 1 floppy, 1 hard disk	Yes	No	Yes	No	None	Any ASCII, DIF, Sylk file	80	1,600	65,000	Applications locking	$349 (per copy)
Conceptual Software Corp. (713) 667-4222	**Prodas**	**MS-DOS, VAX/VMS, Unix**	**IBM PC, XT, AT and compatibles**	**512K**	**1 hard disk**	**No**	**No**	**No**	**No**	**C language, proprietary**	**Any ASCII, DIF, Sylk file**	**200**	**Limited by disk space only**	**Limited by disk space only**	**None**	**$720 (per copy)**

The companies included in this chart responded to a recent telephone survey conducted by *Computerworld*. Further product information is available from vendors.

COMPANY	PRODUCT	OPERATING SYSTEMS SUPPORTED	HARDWARE SUPPORTED	MINIMUM MEMORY REQUIRED (IN BYTES)	NUMBER AND KIND OF DISKS REQUIRED	MULTIUSER CAPABILITY	SUPPORTS LAN USAGE	MENU DRIVEN	QUERY LANGUAGE INCLUDED	PROGRAMMING LANGUAGES SUPPORTED	FULL DATA TRANSFER WITH OTHER SOFTWARE	MAXIMUM FIELD SIZE (IN CHARACTERS)		MAXIMUM NUMBER OF RECORDS PER FILE	SECURITY PROVISIONS	PRICE
Condor Computer Corp. (213) 971-8880	Condor 3	MS-DOS, PC-DOS, CP/M	IBM PC, XT, AT, PS/2 and compatibles	128K	2 double-sided floppies or 1 hard disk	Yes	No	Yes	Yes	Assembler	Any ASCII file	127	127	65,534	None	$495 (per copy)
Cosetic Systems, Inc. (800) 854-2807	C/Base	Unix, Xenix, Ultrix, MS-DOS, PC-DOS	IBM PC, XT, AT and compatibles, Unisys 5000 series, Deskpro 286, 386	512K	1 floppy and 1 hard disk	Yes	No	Yes	Yes	C language	Any ASCII file	36	32,767	2 billion	Password protection	$695 (per copy)
Control Data Corp. (612) 853-3600	IM/ Personal	MS-DOS	IBM PC, XT, AT and compatibles	512K	Hard disk and disk drive required	Yes	Yes	Yes	Yes	—	Any ASCII, PIF, CSV, Cobol files	9,999	150	Limited by disk space only	Password protection	$495 (per copy)
Cosmos, Inc. (206) 643-9898	Revelation	MS-DOS, PC-DOS	IBM PC, XT, AT and compatibles, all Compaq, Televideo, HP Vectra, Tandy TRS-90 (1000 and 2000), Toshiba portable, Zenith 150, Unisys PC, ITT Xtra	320K	2 double-sided floppies	Yes	Yes	Yes	Yes	Proprietary	Any ASCII file	65,000	65,000	Limited by disk space only	Record locking	$950 (per copy)
	Advanced Revelation	MS-DOS, PC-DOS	IBM PC, XT, AT, PS/2 and compatibles, all Compaq machines	512K	One double-sided floppy, 1 hard disk drive	Yes	Yes	Yes	Yes	Proprietary	Any ASCII file	65,000	65,000	Limited by disk space only	Record locking, password protection, function/key enable/disable capability	$950 (per copy)
Cryne Kaiglan, Inc. (703) 532-7036	Response	Wang VS	Wang VS	512K	10M-byte hard disk	Yes	Yes	Yes	Yes	Cobol, Basic, C language, assembler, RPGS, Fortran, PL/I	20/20, 1-2-3	256	2,000	1 million	Password protection	Contact vendor
DAC Software, Inc. (214) 458-0038	Dac-Easy Base	MS-DOS, PC-DOS	IBM PC, XT, AT and compatibles	256K	2 double-sided, double-density disks	No	No	Yes	Yes	Dbase	Dbase II, SDF, ASCII files	255	60	Limited by disk space only	Password protection	$49.95 (per copy)
IBM Software Products (800) 221-3791	Kaleido-scope	MS-DOS, CP/M	IBM PC, XT, AT and compatibles, Unisys micros	640K	Varies according to hardware	No	No	Yes	Yes	Proprietary	Multiplan, 1-2-3, Supercalc	—	20	Depends on disk storage	None	$495 (per copy)
Data Access Corp. (800) 451-FLEX (800) 331-3960 (in Fla.)	Dataflex	PC-DOS, MS-DOS, CP/M, Netware, 3Com Ethernet, Unix System V	All hardware that runs on operating systems listed	256K	2 floppies	Yes	Yes	Yes	Yes	Assembler, Pascal, C language	Any ASCII, DIF file	255	255	16,770,215	Programmable security, passwords	$695-$1,250 (per server)
Database Applications, Inc. (609) 924-2900	NPLR	MS-DOS	IBM PC, XT, AT and compatibles	256K	1 hard disk	Yes	Yes	Optional	Yes	NA	No	999	255	Limited by disk space only	None	$595 (per copy)
	DNPL Reporter	MS-DOS	IBM PC, XT, AT and compatibles	320K	3 floppies, 1 hard disk recommended	Yes	Yes	Optional	Yes	NA	No	999	255	Limited by disk space only	None	$89.50 (per copy)
Data Ease International, Inc. (800) 243-5123, (203) 374-8000 (in Conn.)	Data Ease	MS-DOS, PC-DOS	IBM PC, XT, AT and compatibles, Wang PC, Rainbow, Victor, Unisys PC and compatibles, Texas Instruments PC	384K	2 floppies or 1 floppy, 1 hard disk	Yes (LAN version)	Yes (LAN version)	Yes	Yes	None	Proprietary	255	255	65,525	Password protection, field security	$600 (per copy), $700 (LAN version)
Data Language Corp. (617) 683-8000	Progress	MS-DOS, Xenix, Unix, Ultrix	IBM PC, XT, AT and compatibles, more than 100 other hardware systems	512K (PC version), 1M (Unix version)	2M-byte hard disk required	Yes	Yes	Yes	Yes	Proprietary	Any ASCII file	2,000	Limited by disk space only	Limited by disk space only	Password protection, user ID	$695 (per copy, PC version)
Datapak Software, Inc. (818) 905-6419	Executive Office	Macintosh operating system	All Macintosh computers	512K	1 800K or 2 400K disks	No	No	Yes	No	None	Any ASCII file	Varies	42	Limited by disk space only	None	$249.95 (per copy)
	Notes n' Files	Prodos 16	Apple II	512K	One 3½-in. disk	No	No	Yes	No	None	Any ASCII file	Varies	15	Limited by disk space only	None	$129.95 (per copy)
Dayflo Software Corp. (714) 474-1364	Dayflo Tracker	MS-DOS, PC-DOS	IBM PC, XT, AT and compatibles	384K	1 floppy, 1 hard disk	No	Yes	Yes	Yes	None	Any ASCII file	32,000	Limited by disk space only	65,000	None	From $99.95 (per copy)
	Dayflo Tracker-720	MS-DOS, PC-DOS	IBM PC, XT, AT and compatibles	512K	2 720K-byte floppies	No	Yes	Yes	Yes	None	Any ASCII file	32,000	Limited by disk space only	65,000	None	From $99.95 (per copy)
Dimension Software Systems, Inc. (214) 580-1045	Free Form	Unix System V, VAX/VMS, PC-DOS	AT&T 3B series, DEC Microvax, VAX-11/750, 11/780, IBM PC, XT, AT and compatibles	524K	Varies according to hardware	Yes	Yes	Yes	Yes	Proprietary	—	255	2^{32}	250	Password protection	Contact vendor
Dynacomp, Inc. (716) 265-4040	Dynamaster Database	MS-DOS	IBM PC, XT, AT and compatibles	128K	2 floppies or 1 floppy, 1 hard disk	No	No	Yes	Yes	C language assembler, Cobol	Any ASCII file	1,771	99	Limited by disk space only	None	$99.95 (per copy)
Expert-Ease Systems, Inc. (415) 593-3200	Expert-Ease Graphics DBMS	MS-DOS	IBM PC, XT, AT, 386 and compatibles	640K	1 hard disk, 1 floppy	No	No	Yes	No	Basic, Fortran, C language	None	80	99	5,000	Password protection	$3,600 (development software) $1,100 (runtime)
Finder Information Tools, Inc. (404) 872-2488	Finder, The Retrieval Software	MS-DOS, PC-DOS	IBM PC, XT, AT, PS/2 and compatibles	256K	1 hard disk	Yes	Yes	Yes	No	None	Any ASCII file	256	50	Limited by disk space only	Password protection	$1,500 (per copy)
First Desk Systems, Inc. (800) 522-2286	Firstfile	Macintosh operating system	All Macintosh computers	128K	400K hard disk recommended	No	No	Yes	Yes	None	Any ASCII file	50	100	2 billion	None	$295 (per copy)

COMPANY	PRODUCT	OPERATING SYSTEMS SUPPORTED	HARDWARE SUPPORTED	MINIMUM MEMORY REQUIRED (IN BYTES)	NUMBER AND KIND OF DISKS REQUIRED	MULTIUSER CAPABILITY	SUPPORTS LAN USAGE	MENU DRIVEN	QUERY LANGUAGE INCLUDED	PROGRAMMING LANGUAGES SUPPORTED	FULL DATA TRANSFER WITH OTHER SOFTWARE	MAXIMUM FIELD SIZE (IN CHARACTERS)	MAXIMUM NUMBER OF FIELDS PER RECORD	MAXIMUM NUMBER OF RECORDS PER FILE	SECURITY PROVISIONS	PRICE
First Desk Systems, Inc. (800) 523-3386	**Firstmm**	**Macintosh operating system**	**All Macintosh computers**	**512K**	**800K, hard disk recommended**	**Yes**	**Yes**	**Yes**	**Yes**	**None**	**Any ASCII file**	**255**	**100**	**2 billion**	**Password protection, file locking**	**$795 (per copy)**
Fox Research, Inc. (513) 433-2238	10-Base	MS-DOS	IBM PC, XT, AT and compatibles	256K	1 floppy	Yes	Yes	Yes	Yes	C language, assembler, Basic	Any DIF, ASCII file	1,550	480	Limited by disk space only	—	$495 (per copy, single user), $895 (multiusers)
Fox Software, Inc. (419) 874-0162	**Foxbase Plus**	**MS-DOS, PC-DOS, Xenix, Unix**	**IBM PC, XT, AT and compatibles**	**350K**	**1 hard disk**	**Yes**	**Yes**	**No**	**Yes**	**C language, assembler**	**Any ASCII file**	**254**	**128**	**1 billion**	**None**	**$395 (per copy, single user), $795 (for Xenix)**
General Data Systems Ltd. (215) 985-1780	GDX	MS-DOS	IBM PC, XT, AT and compatibles, Intel 310 supermicros	512K	Hard disk recommended	Yes	Yes	Yes	Yes	Cobol, Pascal, Fortran, C language, assembler	Any	Limited by disk space only	Limited by disk space only	Limited by disk space only	Password protection	$2,500 (PC version)
Goldata Computer Services, Inc. (800) 432-3207	**Goldatabase**	**MS-DOS, PC-DOS**	**IBM PC, XT, AT, PS/2 and compatibles**	**192K**	**1 floppy**	**Yes**	**Yes**	**Yes**	**Yes**	**Basic**	**Any ASCII, DIF file**	**800**	**300**	**Limited by disk space only**	**Password protection**	**$149.95 (per copy)**
Golemics, Inc. (415) 652-5396	Sequitur	PC-DOS	IBM PC, XT, AT and compatibles	256K	1 hard disk or 2 floppies	No	No	Yes	No	None	Any ASCII file	4,000	975	Limited by disk space only	None	$79 (per copy)
Gupta Technologies, Inc. (415) 321-9500	**SQLBase**	**MS-DOS**	**IBM PC, XT, AT and compatibles**	**640K (server), 512K (application nodes)**	**1 hard disk**	**Yes**	**Yes**	**No**	**Yes**	**C language, Cobol**	**Any ASCII or DIF file**	**254**	**250**	**Limited by disk space only**	**Security by record, field, table, user, row**	**$899 (per copy single user)**
IBM (800) 447-4700	Personal Decision Series. Data Edition Version II	MS-DOS	IBM PC, XT, AT, PS/2 Models 30, 50, 60, 80	320K	2 disk drives or 1 disk drive, 1 hard disk	Yes	Yes	Yes	Yes	None	1-2-3, Symphony, Dbase II, III, any ASCII or DIF file	240	100	Limited by disk space only	Password protection	$255 (per copy), $395 (for Network Plus package)
IOTC, Inc. (307) 721-5818	**PDbase**	**Psystem**	**Apple II, III, IBM PC, XT, AT and compatibles**	**128K**	**1 hard disk or 1 floppy**	**Yes**	**Yes**	**Yes**	**Yes**	**Pascal**	**None**	**32,761**	**—**	**Limited by disk space only**	**Password protection**	**$595 (per copy)**
Information Builders, Inc. (212) 736-4433	PC/Focus	PC-DOS, MS-DOS, OS/2	IBM PC, XT, AT and compatibles	650K	10M-byte hard disk	Yes	Yes	Yes	Yes	Fortran, Pascal, assembler, C language	Dbase	256	256	Limited by disk space only	Password protection	$1,295 (per copy)
Informix Software, Inc. (415) 322-4100	Informix-SQL	MS-DOS, PC-DOS, VMS, Unix	IBM PC, XT, AT and compatibles, Microvax, AT&Y micros, Concurrent micros	640K (MS-DOS version), 1M (Unix version)	—	Yes	Yes	Yes	Yes	C language, Cobol	Any ASCII file	Limited by disk space only	Limited by disk space only	Limited by disk space only	Limited access by data base, table, field	From $795 (per copy)
	Informix-4GL	MS-DOS, PC-DOS, VMS, Unix	IBM PC, XT, AT and compatibles, Microvax, AT&T micros, Concurrent micros	640K	—	Yes	Yes	Yes	Yes	C language, Cobol	Any ASCII file	Limited by disk space only	Limited by disk space only	Limited by disk space only	Limited access by data base, table, field	From $995 (per copy)
Inmagic, Inc. (617) 661-8124	Inmagic	MS-DOS, VMS	IBM PC, XT, AT and compatibles, HP 3000, Rainbow, Microvax, Wang PC	384K	1 double-sided floppy or 1 hard disk	Yes	Yes	Yes	Yes	None	Any ASCII file	Limited by disk space only	Limited by disk space only	Limited by disk space only	Password protection	From $975 (per copy)
Innovative Software, Inc. (800) GET SMART	The Smart Data Base Manager	MS-DOS, Unix, Xenix	IBM PC, XT, AT, PS/2 and compatibles, AT&T 3B series	256K (single-user version), 384K (network version)	1 floppy, 1 hard disk	Yes	Yes	Yes	Yes	Proprietary	Any ASCII, DIF, Sylk file	4,096	255	1 million	Password protection, record locking	$695 (per copy)
Interactive Technology, Inc. (503) 644-0111	RDM The Application Developer	VAX/VMS, MicroVMS, RSTS, RSX, Micro RSX, TSX Plus, POS, MS-DOS, RT-11	All VAX, Microvax, PDP-11, Deskpro 350, 380, IBM PC, XT, AT and compatibles	512K	1 hard disk required	Yes	Yes	Yes	Yes	Pascal	Any ASCII file	255	220 (2,048 bytes per record)	16 million +	Password protection	$895 (PC version), $24,500 (high-end VAX version)
The Key Board (505) 281-1795	The Data Base	MS-DOS, PC-DOS	IBM PC, XT, AT, PS/2 and compatibles	256K	1 floppy, hard drive	No	No	Yes	No	None	Any ASCII file	80	100	32,000	None	$29.95 (per copy)
Landmark Software Systems, Inc. (201) 722-5100	X-ample	MicroVMS	Microvax	512K	1 hard disk	Yes	Yes	Yes	Yes	Cobol, C language	Any RMS file	132	1,000	Limited by disk space only	Password protection, user names, function security	$15,000-$20,000 (per copy)
MAI Basic Four, Inc. (714) 730-3440	MAI Origin	Bos/IX, Bos/VS	MAI 1800, 2000, 3000, MAI MPX family	768K	1 hard disk	Yes	Yes	Yes	Yes	Basic	Proprietary	32,000	999	Limited by disk space only	Security at the menu, program, file levels, password protection	$995-$1,995 (per copy)
Metafile Information Systems, Inc. (507) 867-4440	Metafile	MS-DOS	IBM PC, XT, AT and compatibles	256K	2 floppies	Yes	Yes	Yes	Yes	Cobol, Fortran, Basic, Pascal	Any ASCII file	256	510	64,000	Password protection	$695 (per copy)
	Metaview	MS-DOS	IBM PC, XT, AT and compatibles	380K	2 floppies, 1 hard disk required	Yes	Yes	Yes	Yes	Cobol, Fortran, Basic, Pascal	Any ASCII file	256	1,024	Limited by disk space only	Data encryption, field security password protection	Contact Vendor
Michtron, Inc. (313) 334-5700	Trimbase	TOS	Atari 520/1040, ST	512K	1 floppy	No	No	Yes	No	None	Any ASCII file	80	Limited by disk space only	Limited by disk space only	—	$99.95 per copy
Micro Business Applications, Inc. (612) 894-3470	PHD	MS-DOS, CP/M 80, CP/M 86, Netware	IBM PC, AT, XT and compatibles	64K (8-bit environment), 128K (16-bit environment)	1 floppy	Yes	Yes	No	Yes	Cobol, assembler	Any ASCII file	80	1,024	16,777,215	None	$200 (per copy)
Micro Data Base Systems, Inc. (317) 463-2581	Knowledgeman	MS-DOS, PC-DOS	IBM PC, XT, AT and compatibles	512K	1 hard disk	Yes	Yes	Yes	Yes	C language	Any ASCII file	65,535	255	More than 1 billion	Password protection	$595 (per copy)

COMPANY	PRODUCT	OPERATING SYSTEMS SUPPORTED	HARDWARE SUPPORTED	MINIMUM MEMORY REQUIRED (IN BYTES)	NUMBER AND KIND OF DISKS REQUIRED	MULTIUSER CAPABILITY	SUPPORTS LAN USAGE	MENU DRIVEN	QUERY LANGUAGE INCLUDED	PROGRAMMING LANGUAGES SUPPORTED	FULL DATA TRANSFER WITH OTHER SOFTWARE	MAXIMUM FIELD SIZE (IN CHARACTERS)	MAXIMUM NUMBER OF FIELDS PER RECORD	MAXIMUM NUMBER OF RECORDS PER FILE	SECURITY PROVISIONS	PRICE
Microvim, Inc. (206) 885-2000	**R:base System V**	**PC-DOS**	**IBM PC, XT, AT, PS/2 and compatibles**	**512K**	**1 hard disk or 2 floppies**	**Yes**	**Yes**	**Yes**	**Yes**	**Proprietary, Fortran, Pascal**	**Any ASCII, DIF, Sylk file**	**4,032**	**800**	**Limited by disk space only**	**Password protection, LAN locking, collision detection, table locking**	**$700 (per server)**
Microsoftware International, Inc. (605) 335-7676	EZ Base II	MS-DOS, PC-DOS, Unix, Xenix, VAX/VMS, RT11	IBM PC, XT, AT and compatibles, Microvax, PDP-11	192K	2 floppies	Yes	Yes	Yes	Yes	None	1-2-3, Multiplan, PCwrite	30	108	Limited by disk space only	Password protection	$695 (per copy, micros), $3,995 (VAX)
Microsystems Engineering Corp. (312) 882-0111	**Mass 11 Manager**	**MS-DOS**	**IBM PC, XT, AT and compatibles**	**448K**	**2 floppies, hard drive recommended**	**No**	**No**	**Yes**	**Yes**	**None**	**Dbase II, III**	**1,000**	**256**	**65,000**	**Password protection**	**$495 (per copy)**
Miller Microcomputer Services (617) 653-6136	Datahandler	Requires MMSfourth (proprietary)	IBM PC, XT, AT and compatibles, Tandy TRS-80	48K	1 floppy	Yes	Yes	Yes	No	Proprietary	Proprietary	255	70	64,000	None	Contact Vendor
	Datahandler Plus	MS-DOS, requires MMSfourth (proprietary)	IBM PC, XT, AT and compatibles	128K	1 floppy	Yes	Yes	Yes	No	Proprietary	Proprietary	255	70	64,000	None	Contact Vendor
Must Software International (203) 762-2515	**PC Nomad**	**MS-DOS, PC-DOS**	**IBM PC, XT, AT, PS/2 and compatibles**	**640K**	**1 hard disk, 1 floppy**	**Yes**	**No**	**Yes**	**Yes**	**None**	**Any ASCII, DIF file**	**256**	**499**	**Limited by disk space only**	**Compiled schema**	**$795 (per copy)**
Nantucket Corp. (213) 390-7923	McMax	Macintosh operating system	Macintosh, Mac SE, Mac Plus, Mac II	512K	1 800K-byte floppy	No	No	Yes	Yes	Dbase III, Dbase III Plus	Topx, Macink, Dyna	255	63	16,000,000	None	$295 (per copy)
	Clipper	MS-DOS, PC-DOS	IBM PC, XT, AT and compatibles	256K	Dual floppy or 1 hard disk	No	Yes	No	No	Dbase III, Dbase III Plus	Any ASCII file	32K	1,024	Limited by disk space only	None	$695 (per copy)
Oak Marketing (division of Anil, Inc.) (201) 445-8535	**Rajas**	**MS-DOS**	**IBM PC, XT, AT and compatibles**	**128K**	**2 floppies**	**No**	**No**	**Yes**	**Yes**	**None**	**1-2-3, Dbase III**	**67**	**250**	**Limited by disk space only**	**Password protection, field-level protection, menu protection**	**$195 (per copy)**
Odesta Corp. (312) 498-5615	Helix	Macintosh operating system, VAX/VMS	All Macintosh computers, Microvax 2000	1M	Hard disk recommended	Yes	Yes	No	Yes	None	Any ASCII, DIF, Sylk file	32,500	Limited by disk space only	Limited by disk space only	Passwords, user-definable permissions	$595 (per copy), $4,500 (VAX version)
O'Hanlon Computer Systems, Inc. (206) 454-5350	**O'Hanlon Database Solution**	**MS-DOS, PC-DOS, Concurrent PC-DOS, CP/M 86, Turbo DOS 86, Netar**	**IBM PC, XT, AT and compatibles**	**128K**	**Hard disk recommended**	**Yes**	**Yes**	**Yes**	**—**	**NA**	**1-2-3, Multiplan, Wordstar**	**30,496**	**1,000**	**16,777,216**	**Available but not included**	**$995 (multiuser)**
On-Line Software International, Inc. (609) 799-6300	Ramis PC Workstation	PC-DOS, MS-DOS	IBM PC, XT, AT and compatibles	512K	1 floppy, 1 hard disk	Yes	Yes	Yes	Yes	None	1-2-3 Dbase, any ASCII, DIF file	75	255	4 billion	Password protection	$375 (per copy)
Opus Systems (800) 338-3276	**Harmony Information Manager**	**MS-DOS**	**IBM PC, XT, AT and compatibles**	**512K**	**1 floppy, 1 hard drive**	**No**	**No**	**Yes**	**No**	**None**	**Proprietary**	**30**	**50**	**Limited by disk space only**	**Password protection**	**$299 (per copy)**
Oracle Corp. (800) 345-DBMS	Oracle	MS-DOS	IBM PC, XT, AT, PS/2 and compatibles, Deskpro 386	640K or 1.5M (depending on version)	6M or 4 5M bytes on a hard disk (depending on version)	Yes	Yes	Yes	Yes	C language, Cobol	Any DIF, Sylk, WKS file	255	255	Limited by disk space only	Password protection, selective access to data dictionary, audit capabilities	$695-$1,295 (depending on version)
PC Manager, Inc. (703) 356-4600	**Data Edge**	**MS-DOS, PC-DOS**	**IBM PC, XT, AT and compatibles, Wang PC**	**256K**	**2 floppies or 1 floppy, hard drive**	**Yes**	**Yes**	**Yes**	**No**	**Proprietary**	**Dbase**	**254**	**880**	**Limited by disk space only**	**Password protection**	**$395 (per copy)**
Palantir Software (800) 368-3797	Windows Filer	MS-DOS	Any Microsoft Windows-compatible IBM PC	512K	Hard disk recommended	No	No	Yes	Yes	None	Dbase	256	300	Limited by disk space only	None	$195 (per copy)
Panaphic Systems, Inc. (800) 323-7335	**Easytrieve Plus PC**	**MS-DOS, PC-DOS**	**IBM PC, XT, AT PS/2 and compatibles**	**384K**	**Hard disk required**	**No**	**No**	**Yes**	**Yes**	**Basic, assembler**	**1-2-3, Dbase, EBCDIC, ASCII files**	**4,000**	**2,000**	**16 million**	**Password protection**	**$850 (per copy)**
Paperback Software International (415) 644-2116	VP Info	MS-DOS, PC-DOS	IBM PC, XT, AT and compatibles	256K	2 floppies	Yes	Yes	No	No	Proprietary	Any ASCII file	254	256	65,535	File and record locking	$99 95 (per copy)
Parameter Driven Software, Inc. (313) 540-4460	**PDS-Adept**	**MS-DOS, Unix, CTOS, BTOS**	**IBM PC, XT, AT and compatibles, Convergent Technology Unix hardware, Unisys Unix hardware, Towers, AT&T 3B, Convergent Exgenix, B25 series**	**512K**	**Hard disk drive required**	**Yes**	**No**	**Yes**	**No**	**Proprietary**	**Any ASCII, Sylk, DIF file**	**60**	**99**	**Limited by disk space only**	**Password protection available under BTOS**	**$595-$16,000 (per copy depending on hardware)**
Peachtree Software, Inc. (800) 24-PEACH	Peachtree Data Query	MS-DOS	IBM PC XT AT and compatibles	256K	2 floppies, 1 floppy, hard drive	No	No	Yes	No	—	Any ASCII file	Limited by disk space only	Limited by disk space only	Limited by disk space only	None	$199 (per copy)
Pearlsoft, Inc. (503) 682-3636	**Pearl Base**	**PC-DOS, CP/M**	**IBM PC, XT, AT and compatibles**	**256K**	**Hard disk recommended**	**No**	**Yes**	**Yes**	**No**	**None**	**Dbase, any ASCII file**	**79**	**Limited by disk space only**	**Limited by disk space only**	**Password protection**	**$395 (per copy)**
Pecan Software Systems, Inc. (800) 63-PECAN (718) 851-3100	Jack2	MS-DOS, PC-DOS	IBM PC, XT, AT and compatibles	128K	2 floppies or 1 floppy, 1 hard disk	No	No	Yes	Yes	None	Any DIF file	255	Limited by disk space only	Limited by disk space only	None	$99 95 (per copy)
	Swan Relational Data Base	PC-DOS, MS-DOS, Prodos, TOS, VAX/VMS, PDP-11, Amiga DOS	IBM PC, XT, AT and compatibles, Apple II series, Atari ST, Commodore Amiga	128K	1 floppy	Yes	Yes	Yes	Yes	Pascal	Any ASCII file	Limited by disk space only	Limited by disk space only	Limited by disk space only	Password protection	$59 95 (per copy)

COMPANY	PRODUCT	OPERATING SYSTEMS SUPPORTED	HARDWARE SUPPORTED	MINIMUM MEMORY REQUIRED (IN BYTES)	NUMBER AND KIND OF DISKS REQUIRED	MULTIUSER CAPABILITY	SUPPORTS LAN USAGE	MENU DRIVEN	QUERY LANGUAGE INCLUDED	PROGRAMMING LANGUAGES SUPPORTED	FULL DATA TRANSFER WITH OTHER SOFTWARE	MAXIMUM FIELD SIZE (IN CHARACTERS)	MAXIMUM NUMBER OF FIELDS PER RECORD	MAXIMUM NUMBER OF RECORDS PER FILE	SECURITY PROVISIONS	PRICE
Polytron Corp. (800) 547-4000	Polydesk III	MS-DOS	IBM PC, XT, AT and compatibles	100K	1 floppy, 1 hard disk recommended	No	Yes	Yes	No	None	Dbase III	255	128	Limited by disk space only	None	$99 (per copy)
QAX International Systems Corp. (904) 596-2090	FL Personal Data Base	Super-DOS, RDOS	IBM PC, XT, AT and compatibles, most DG microcomputers	64K	1 hard disk	No	No	Yes	No	None	No	60	240	65,000	Password protection	$495 (per copy)
The Rapport Corp. (312) 968-0270	Rapport	MS-DOS	IBM PC, XT, AT and compatibles	640K	Hard disk required	No	No	Yes	Yes	Fortran, Cobol	None	Limited by disk space only	Limited by disk space only	Limited by disk space only	Password protection, data encryption	$1,500 (first copy)
Relational Technology, Inc. (800) 631-8325	Ingres	MS-DOS	IBM PC, XT, AT, PS/2 and compatibles	640K	1 hard disk, 1 floppy	No	Yes	Yes	Yes	C language, Cobol	Any ASCII, DIF, Sylk file	2,000	127	Limited by disk space only	None	$800 (per copy)
Resolve Logic Systems (416) 927-0065 (in Canada) (412) 369-4900 (in U.S.)	Prevail Integrated Productivity Set (Opus board necessary to run on PCs)	Unix System V.2, V.3, 4.2	IBM PC, XT, AT and compatibles	1M byte	Hard disk 40M bytes and up	Yes	Yes	Yes	Yes	Cobol	Any ASCII file	Limited by disk space only	Limited by disk space only	Limited by disk space only	Password protection	$2,200 (for PC version with Opus card)
Santa Cruz Operation (408) 425-7222	SCO Foxbase Plus	Xenix	IBM PC, AT and compatibles, Vectra, AT&T 6300 PC, 80386-based systems	1.5M	10M-byte hard disk	Yes	Yes	No	Yes	None	Dbase III plus	256	128	1 billion	Record and file locking	Contact vendor
	SCO Foxbase	Xenix	IBM PC, AT and compatibles, Vectra, AT&T 6300 PC, 80386-based systems	—	—	Yes	Yes	No	Yes	None	Dbase II	256	48	65,535	Record and file locking	Contact vendor
Seattle Software, Inc. (800) 247-8780	Ask Sue	MS-DOS, PC-DOS	IBM PC, XT, AT and compatibles	256K	1 floppy	Yes	Yes	Yes	Yes	Proprietary	Any ASCII, Dbase file	1,000	Limited by disk space only	Limited by disk space only	Password protection, encryption	$100 (per copy)
Seed Software Corp. (800) 445-DBMS	Seed DBMS, Proseed	MS-DOS	IBM PC, XT, AT and compatibles, IBM 370 series, Microvax II	640K	10M-byte hard disk	No	No	No	Yes	Fortran, C language	None	32,767	1,000 per schema	100 per schema	Password protection	Contact vendor
Sheridan, Inc. (800) 631-1068	Benchmark Software Data Manager	MS-DOS	IBM PC, XT, AT and compatibles, Wang 2200, Zenith 100	256K	1 floppy	Yes	Yes	Yes	No	None	Dbase, 1-2-3, any DIF file	1,000	64	Limited by disk space only	None	$99 (per copy for data base), $395 (for management package)
Software Connections, Inc. (distributed by Lanquest Group) (408) 727-9448	Datastore	MS-DOS	IBM PC, XT, AT and compatibles	237K	1 hard disk	Yes	Yes	Yes	Yes	None	1-2-3, Wordstar, Dbase	80	512	Limited by disk space only	Audit trails, password protection, field masking	$495 (per copy), $1,195 (LAN version)
The Software Group (818) 897-0808	Builder	MS-DOS	IBM PC, XT, AT and compatibles	384K	1 dual floppy or hard disk	Yes	Yes	Yes	Yes	Basic, Pascal, C language	Dbase III, Dbase III Plus, Condor III, ASCII files	64,000+	894	64,000+	Record and file locking, password protection	$695 (per copy), From $795 (for LAN version)
Software Products International, Inc. (619) 450-1526	Open Access II	PC-DOS, MS-DOS	IBM PC, XT, AT, PS/2 and compatibles	256K	2 floppies	Yes	Yes	Yes	Yes	Proprietary	Dbase, any ASCII, DIF file	78	100	2.2 billion	Record locking, password protection	$395 (per copy), $245 (per node for LAN version)
Software Publishing Corp. (415) 962-8910	PFS:Professional File	MS-DOS	IBM PC, XT, AT and compatibles	256K	1 floppy, 1 hard disk or 2 floppies	Yes	Yes	Yes	No	None	1-2-3, any ASCII file	1,000	2,500	20,000	None	$249 (per copy)
Star Software, Inc. (800) 242-7627	DB Partner	MS-DOS	IBM PC, XT, AT and compatibles	256K	2 floppy drives	Yes	Yes	Yes	No	None	Dbase II, Dbase III, Rbase, Multiplan, any ASCII file	35	999	1 million	None	$195 (per copy)
Symantec Corp. (408) 253-9600	Q&A	PC-DOS, MS-DOS	IBM PC, XT, AT, PS/2 and compatibles	512K	Minimum 3 double-sided floppies	Yes	Yes	Yes	Yes	C language	Any ASCII file	1,678	2,182	Limited by disk space only	None	$349 (per copy)
Thoroughbred Software (800) 524-0430 (201) 722-9565 (in N.J.)	Idol-II	Proprietary, Unix, Xenix, VAX/VMS	IBM PC, XT, AT and compatibles, PS/2, any machine supporting Unix, all DEC machines, HP 9000 series	256	Varies according to hardware	Yes	No	Yes	No	Basic, proprietary	ASCII files	—	Limited by disk space only	Limited by disk space only	Password protection	$795-$3,895

COMPANY	PRODUCT	OPERATING SYSTEMS SUPPORTED	HARDWARE SUPPORTED	MINIMUM MEMORY REQUIRED (IN BYTES)	NUMBER AND KIND OF DISKS REQUIRED	MULTIUSER CAPABILITY	SUPPORTS LAN USAGE	MENU DRIVEN	QUERY LANGUAGE INCLUDED	PROGRAMMING LANGUAGES SUPPORTED	FULL DATA TRANSFER WITH OTHER SOFTWARE	MAXIMUM FIELD SIZE (IN CHARACTERS)	MAXIMUM NUMBER OF FIELDS PER RECORD	MAXIMUM NUMBER OF RECORDS PER FILE	SECURITY PROVISIONS	PRICE
Travelling Software, Inc. (800) 343-8080	T-base	Xenix	Tandy Models 1400, 1402, 3000, NEC 8881, 8300	3K	NA	No	No	No	No	Many	Any ASCII file	40	—	Limited by disk space only	None	$99.95-$149.95 (per copy)
Unify Corp. (916) 920-9092	Unify	MS-DOS, Unix, Xenix	IBM PC, XT, AT and compatibles	512K	1 10M-byte hard disk	Yes	Yes	Yes	Yes	Cobol, C language	1-2-3, Dbase, Microsoft Word	256	2,000	2 billion per data base	Password protection	$995 (per copy)
Unisys Corp. (813) 545-3278	Personal Mapper System	MS-DOS, PC-DOS	Unisys PC/IT, PC/Micro IT, IBM PC, XT, AT and compatibles	256K	3 floppy	Yes	Yes	No	Yes	Proprietary	Any DIF, PRN file	132	Varies	Varies	Password protection	Contact vendor
Unlimited Processing, Inc. (800) 874-8555	Team-Up	MS-DOS	IBM PC, XT, AT and compatibles	256K	Hard disk required	Yes	Yes	Yes	Yes	Proprietary	Any DIF, ASCII file, 1-2-3	1,900	3,000	4 billion	—	$795 (per copy), $1,795 (LAN version)
Ventureman, Inc. (617) 681-1230	The Prelude Data Base	Unix	AT&T 3B2, 3B5, PC 6300, IBM PC, XT, AT and compatibles	600K	1 or 2 floppies	Yes	Yes	No	No	C language	Any ASCII file	2,047	2,047	Limited by disk space only	Password, restricted fields, users group and global permissions	Contact vendor
Wang Laboratories, Inc. (800) 522-9264	PC Data Base	MS-DOS	Wang PC, Wang Advanced PC	384K	Dual disk or single disk, hard disk	No	Yes	Yes	No	—	Any Sylk file, proprietary	50	15,000	4 billion	—	$495 (per copy)
Wardtech Systems, Inc. (415) 354-8000	DBXL	PC-DOS, MS-DOS	IBM PC, XT, AT and compatibles, Apricot, Wang, Tandy, Ransbury, Zenith	480K	—	No	No	Yes	No	Dbase	Dbase III, Quickdraw	254	128	2 billion	None	$100 (per copy)
Zanthe Information, Inc. (800) 367-8972	ZIM	MS-DOS, PC-DOS, QNX, Xenix, Unix, VAX/VMS, VM/CMS, Netware	IBM PC, XT, AT and compatibles	640K (recommended), 512K (minimum)	2 floppies	Yes	Yes	No	Yes	C language	Any ASCII or DIF file	8,000	Limited by disk space only	Limited by disk space only	None	Contact vendor

Solving Murder One on a micro

BY KENDRA BONNETT

During the first half of the decade, 15 to 17 Los Angeles prostitutes were murdered, and enough similarities existed among the deaths to lead police to suspect they were dealing with a serial murderer. In January 1986, the Los Angeles Police Department (LAPD) assigned several detectives, Metro officers and a couple of microcomputers to the Southside Serial Murder Task Force.

Putting police on a special task force is a proven tactic in solving serial murders; enlisting micros was, however, a new twist for the LAPD.

Using computers was already standard operating procedure for LAPD detectives. Enforcing law and order in Los Angeles, a city of almost three million inhabitants, requires a mainframe system with huge data bases recording crimes and other incidents that require a written report, as well as automobile and drivers' records. The LAPD's system, an IBM 3090, holds about five years' worth of field interview reports, which are taken at the scene of every accident or crime. Police can later access these via 3270 terminals.

Bonnett is a free-lance writer based in Greenwich, Conn.

The mainframe is primarily an administrative system, however, and is not designed to permit freewheeling inquiry. "There's no flexibility; you can't do any ad hoc querying," explains Richard Sullivan, manager of emerging technology with the Los Angeles Information Services Department. "There is no way to quickly run a few bunches through that system."

At the time of the Southside Serial Murder Task Force's creation, the LAPD was already interested in the possibilities of using microcomputers on special cases. So, with the help of Information Services, they used the task force as a test case. Information Services loaned the task force a couple of IBM Personal Computer ATs and Paradox, a relational data base and programming language from Ansa Software.

Sullivan spent four months with the task force, developing software applications and teaching detectives to use the program. In the process, both he and the police learned a lot about using micros in police work.

Usually, all case clues are taken by hand and then kept in notebooks. Each time someone reports information pertinent to a case, a form is filled out and added to the books. Detectives must then go through the books looking for information, similarities in clues, anything that might help them before going out into the field to follow up on a lead.

To lend some consistency to the procedure, one person is awarded the title "Clues King" and put in charge of organizing the many pieces of disconnected information coming in from all sides. This detective functions rather like a human computer, keeping a mass of information in his head, and is familiar enough with data to assign priority to clues.

When Sullivan and the task force first began working with Paradox, they borrowed heavily from these existing procedures. The ease of the Paradox application development language, combined with the advantage of having a noncomputerized model from which to draw, enabled Sullivan to get a working prototype running in just a couple of days and to complete a full application in about a week.

Sullivan admits a few mistakes were made in the process and says he is grateful for Paradox's prototyping and forgiving nature. "We ended up doing a lot of refining," he concedes.

The first mistake was building a record with fields for every conceivable type of clue. "We had about 250 fields divided into three categories — people clues, vehicle clues and crime-scene evidence," Sullivan explains. As it turned out, a number of the fields were extraneous. Even unfilled fields take up disk space and slow down searches, so in the end the record was narrowed to about 100 fields.

Using a micro and the Paradox package increased response time significantly. Police could check a new clue against others already entered into the data base or download files from the mainframe for analysis against the data base contents.

> PUTTING POLICE on a special task force is a proven tactic in solving serial murders; enlisting micros in such an effort was, however, a new twist for the LAPD.

For example, when given a license plate number of a car seen in the vicinity of a crime just before or after a prostitute was murdered, the LAPD could run not only that number but also several close variations against Department of Motor Vehicles records, using Paradox's Like selection criterion.

"There were between 10,000 and 12,000 clues involved in this case," Sullivan says, "so this ability to cross-reference data made it possible to weed out the important leads from the rest and gave the police high-priority leads to follow up."

The PC-based system also greatly enhanced the department's ability to analyze crime data for possibly significant patterns. In this particular case, no pattern was discerned, lending further weight to the suspicion that these murders had not been committed by the same person.

"It had always been one theory that these prostitute murders were not really the work of one person," Sullivan explains. "Our computer analysis tended to support that belief."

Over a period of several months, police arrested several suspects who appeared to be responsible for one or more of the murders. It has been close to a year since the last prostitute murder, and the task force is winding down.

Paradox seems, however, to have laid the foundation for a continuing career for itself in the LAPD. Sullivan says he has installed 155 copies of the software. It is not a replacement for the mainframe, he says, but it does provide invaluable assistance in identifying patterns in local crimes. ●

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— Mark Potenzone
Westinghouse Management
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Mark Potenzone is National Sales Manager for Westinghouse Management Systems Software. This group within Westinghouse markets IBM mainframe productivity enhancement software and operating systems software.

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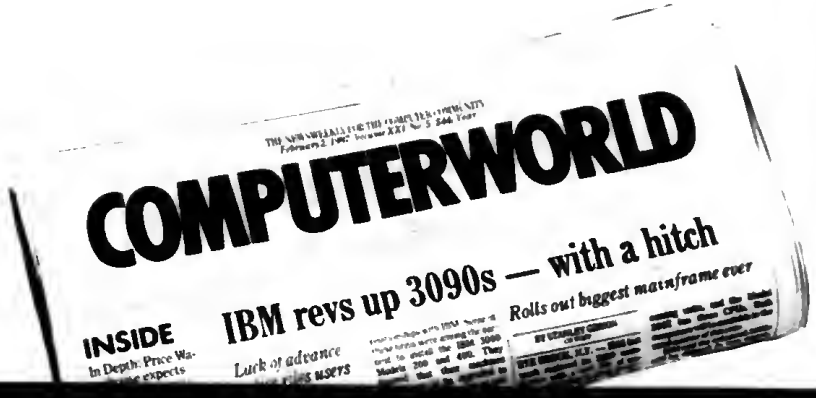

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Sept 28	Hardware Roundup Small Scale Systems	Sept 11
Oct 5	Hardware Roundup: Micros	Sept. 18
Oct 12	Leasing & Used Equipment	Sept 25
Oct 19	Capacity Planning/ Performance Monitoring Software	Oct. 2
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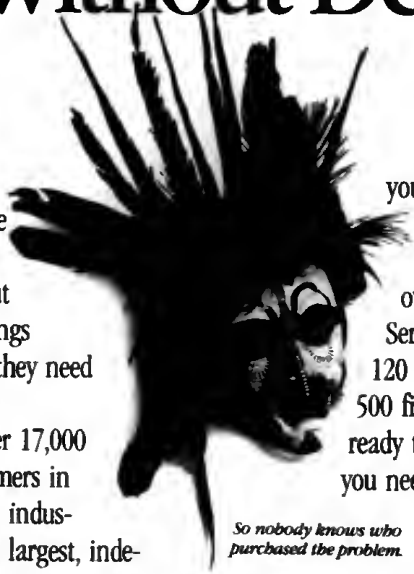

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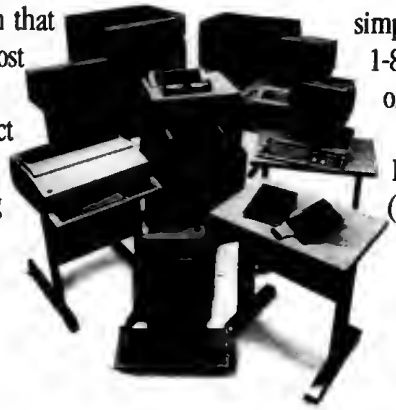

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SYSTEMS & PERIPHERALS

HARD TALK

James Connolly

The curse of hidden costs

The old saw about there being no such thing as a free lunch apparently can be applied to the computer industry.

Remember when the lunch was free but the beer cost a couple of bucks? Of course, if some computer companies ran taverns, a beer would cost $10 and the use of the plate and fork would be $5 per minute. Oh, you wanted a napkin, too?

Hidden costs are a curse for any consumer, whether the consumer is a peon looking for a quick, cheap lunch or an international megacorporation buying truckloads of computers.

For computer buyers, even a couple of hidden costs can mean the five-year cost of ownership is twice the up-front price of a system. That observation was made recently by industry analysts at The Sierra Group in connection with the firm's second annual cost-of-ownership study.

The firm found broad cost of ownership differences among various vendors providing systems for the same number of us-

Continued on page 52

IBM sets chips, wafers in play

Firm revs up high-tech production line for new breed of semiconductors

BY JAMES CONNOLLY
CW STAFF

ESSEX JUNCTION, Vt. — The computer industry's first 8-in. wafer-scale semiconductor fabrication line is expected to move from pilot testing to production by year's end as part of an ongoing reorganization and reorientation of IBM's chip facility in this suburb of Burlington, Vt.

At the same time that IBM is retooling and gearing up for 8-in. wafer production, the facility is preparing for production of 4M-bit memory chips — in the complex's first building designed for semiconductor production — and is completing an organizational move that melds its traditional development and manufacturing with new marketing roles.

The changes at the Essex Junction plant and the adjoining IBM laboratory in Williston, Vt., are occurring during the facility's 30th year of operation. During that time, the complex has grown from a 40,000-sq-ft facility with 500 employees to a 3-million-sq-ft facility with 8,000 workers, making it Vermont's largest employer.

IBM officials say the facility's orientation has changed drastically during the past five years. Five years ago, various groups acted as a relay team, "passing the baton from one to the other," according to plant manager Norbert R. Lavigne. A development group would pass a project to product qualification, which in turn would pass responsibility to manufacturing, all with little interaction among the groups.

The organization now emphasizes an overlapping of the

Continued on page 53

Data View

Uninterruptible power supply installations

Sites by major system type

INFORMATION PROVIDED BY COMPUTER INTELLIGENCE
CW CHART: AMY J. SWANSON

Plexus adds departmental low-end CPU

Unix machine offers expansion options

SAN JOSE, Calif. — Plexus Computers, Inc. recently announced the Plexus P/90, an entry-level addition to its line of departmental processors.

Plexus said the Unix-based P/90 was designed to support up to 64 simultaneous users.

The computer is intended as a low-end system to fill out Plexus's Extended Data Processing (XDP) system, which was introduced in March. The XDP line is notable for its ability to manage

Continued on page 53

STC offers enhanced disk drives

LOUISVILLE, Colo. — Storage Technology Corp. last week claimed performance gains and space requirement reductions with the introduction of IBM-compatible single-capacity disk drives and reduced-footprint disk subsystems.

Storage Technology also enhanced its 6100 laser printer to support IBM's Advanced Function Printing (AFP) software.

The drive is the 2.5G-byte 8380P, which Storage Technology officials said provides an average access time improvement of 20% in comparison with IBM 3380D-class drives and 27% compared with IBM 3380E-class drives. The company said it will continue to market its existing 8380 single-capacity and 5G-byte dual-capacity drives and that the 8380P can be upgraded to a dual-capacity drive.

Jim Griffing, manager of worldwide on-line storage marketing for Storage Technology,

Continued on page 52

Inside

- Project Software cuts price of turnkey Microvax II-based systems. Page 51.
- Seiko rolls out family of raster display systems. Page 54.
- HP releases high-performance disk controller cache. Page 54.

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Hidden costs

CONTINUED FROM PAGE 51

ers. The Tempe, Ariz., group examined the cost of owning four vendors' minicomputers in select configurations for one and five years. The configurations ranged from four- to 100-user systems. The gap between the least expensive and the most expensive systems reached $500,000 at the 100-user level.

In addition to the differences among vendors, The Sierra Group found there was little similarity between the price of a system and the cost of ownership because of costs such as maintenance. "In one case, the cost of software maintenance was almost four times the initial cost of the software. It's not unusual for overall hardware and software maintenance to double the cost of a system," Vice-President Marty Gruhn wrote in the group's report.

"It's clear that users need to educate themselves on both the product and the pricing strategies of the vendors whose products they are evaluating to avoid paying too much for the same results. Hardware prices alone are almost worthless as a basis for comparison," Gruhn wrote.

Connolly is *Computerworld's* senior editor, systems & peripherals.

STC drives

CONTINUED FROM PAGE 51

said the gains were achieved through a series of large-scale integrated circuit improvements.

The reduced-footprint subsystem, the 8380R, can be configured with the older single- and dual-capacity 8380s or the 8380P. Griffing said the subsystem uses 16 actuators and features capacities ranging from 10G to 20G bytes, with footprint savings of about 50% when compared with an equivalent 8380E subsystem.

Small shoe to fill

According to Griffing, the footprint allows greater configuration flexibility and allows a manager to increase storage capacity without having to expand the data center.

He said the 8380P and 8380R have cleared beta testing and that the 8380P will be available during the fourth quarter. He said the 8380R will be available during the first quarter of 1988.

A 20G-byte 8380R configuration costs $360,000, and an 8380P costs $65,000.

Printer enhancements

The enhancements to the 6100 printer include an all-points addressable controller with 5M bytes of memory that eases printing of complex pages. The all-points addressability feature is introduced through microcode and makes every point on the page individually definable to the printer.

The AFP software includes the IBM Print Services Facility, the Print Management Facility and the Overlay Generation Language.

Storage Technology also announced hardware options for the 6100, including a forms overlay buffer and an expanded matrix memory, which it said allows customers to increase the number of character sets from four sets of 64 characters to 64 sets of 255 characters.

Project Software cuts price on Microvax II-based systems

CAMBRIDGE, Mass. — Hoping to make its project management software more attractive to corporate departments, Project Software & Development, Inc. last week slashed the price of its turnkey Digital Equipment Corp. Microvax II-based systems by as much as 60%.

Project Software said the change is a result of a new user-based software pricing scheme.

Previously, the firm'a packaged system for any number of users was priced at $260,000.

A system with a two-user license for the Project/2 scheduling and graphics software is now $99,200. The system includes 9M bytes of memory, a 318M-byte hard disk drive, a color and a monochrome terminal, a printer, Project/2 software with a relational data base manager based on Oracle Corp.'s Oracle, installation and training.

Licensing each additional user costs $10,240.

The company made similar reductions on its other mainframe and minicomputer packages.

Reductions across the board

For example, an unlimited license for high-end DEC VAX 8000 series machines was priced at $360,000 but will now be offered in a two-user version for $108,000.

Although the company sells its software for both IBM and VAX systems, sales director Dean Goodermote noted that interest in VAX products by the industry has skyrocketed lately.

Previously, be said about one customer in 10 asked for information about VAX products. That ratio has increased lately to two customers out of every three.

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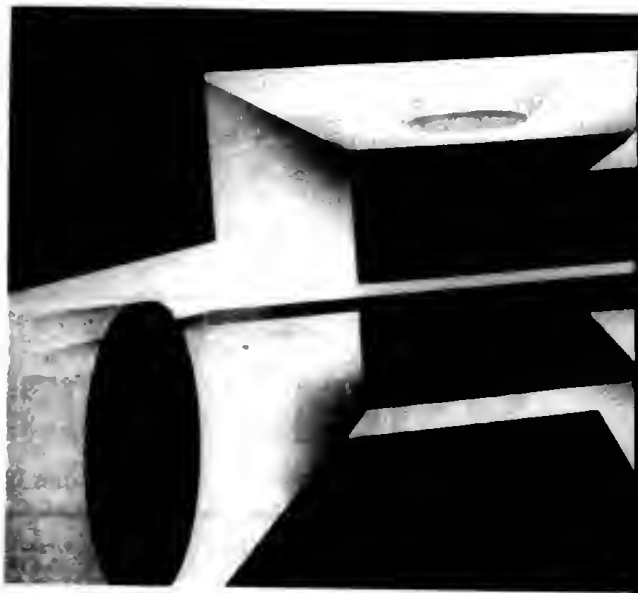

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For example, the calendars in ARTEMIS Project identify several work patterns including shift work, union rules and holidays for different countries. An interactive Calendar Editor then lets you compare those schedules to review workdays, make adjustments and defuse potential problems before they become real ones. Lesser systems just can't come close to this level of sophistication—or simplicity.

The interface makes it easy

Give ARTEMIS Project a screen test and you'll find the interface that's popular with users. Menus. Shortcut key operations. On-line, on-screen help that follows you along. Plus pull-down windows that build onto each other, tracing your steps and thinking ahead to your next move.

Watch networks develop

With the ARTEMIS Project interactive Network Editor, you can see your project network develop while you create it. Just like working with pencil and paper. The Network Editor gives you a more accurate and immediate view of

IBM chips

CONTINUED FROM PAGE 51

groups. "One of the ways we did that was to make sure that manufacturing was involved very, very early in the development cycle," Lavigne says. He notes that manufacturing groups have daily interaction with officials from the development laboratory, headed by laboratory director Luis M. Arzubi.

Lavigne says the reorientation came about, in part, because IBM freed the company's various systems groups from requirements that they use the company's own chips in all systems. Now, although most of the chips used in IBM systems are made by the company, the Vermont facility is competing with outside suppliers to a limited extent. A spokesman says the facility also is free to sell chips outside of IBM, although that has not yet been done. Emphasizing that the current way of doing things is better, Lavigne says, "We are much more aware of the importance of our products."

IBM in Burlington recently completed its latest chip fabrication line in a building. It is one of the few buildings in the world designed from the ground up as a semiconductor plant. Vibration that can cause chip flaws is minimized by a foundation that includes reinforced concrete slabs arranged in a cantilevered manner. The three-story design concentrates air conditioning and wiring on the third floor and piping on the first level, leaving the center level for chip making. That building processes both logic circuits and memory chips.

A spokesman says the design provides for an overall clean-room atmosphere of 150 0.5-micron particles per million parts of air. In work areas under protective glass hoods, particles measure less than one part per million.

Moving toward 200mm wafers

In another building, IBM is gearing up for the move to 8-in., or 200mm, wafers. Noting that most chip makers are committed to 8-in. wafer technology, Lavigne says, "We decided to go to the 8-in. wafer instead of the 8-in. wafer because we feel we need the productivity gains." The gains can mean a yield of 450 chips from an 8-in. wafer, compared with 150 chips from a 6-in. wafer, according to IBM.

The commitment to 8-in. technology required IBM to establish special relationships with semiconductor tool makers. "When we went looking for suppliers for 200mm equipment, we did not find the tools were available," Lavigne says.

The agreements involved changes ranging from minor upgrades of semiconductor machinery to fully customized processing equipment designed to handle larger wafers.

Meanwhile, the facility is preparing for the shift to 4M-bit memory chips. IBM researchers described those chips in a technical paper published in March. The Vermont plant, which produced the first experimental 1M-bit chips in 1984 and first-production 1M-bit chips in 1986, now supplies 1M-bit memory chips for all of IBM's major processors, ranging from the Personal System/2 microcomputers to the 3090 mainframe line.

Arzubi reports IBM is on a pace that could place 4M-bit chips into finished systems in January 1989. He says the implementation time is two-thirds what it was several chip generations ago because of improvements in the learning curve.

The quadrupling factor

Vermont researchers are working with IBM's Thomas J. Watson Research Center in Yorktown Heights, N.Y., to develop 16M- and 64M-bit chips. Arzubi says IBM's goal is to quadruple the number of bits on a memory chip every two years, which has been done since the 64K-bit chip was developed in 1978.

Arzubi says the 4M-bit chip, which was fabricated on existing production lines, will have an access time of 65 nsec, compared with 80 nsec for the second generation of 1M-bit chips. That second generation is used in the 3090E series and is CMOS-based. The first generation, installed in the original 3090s in April 1986, was based on silicon and aluminum metal oxide semiconductors with an access time of 150 nsec.

Arzubi says the use of a trenching technique, in which capacitors are placed several atoms below the chip surface, allows IBM to minimize the size of the 4M-bit chip and could help in the design of denser chips. "I feel very comfortable that we have at least three more generations to extract from CMOS technology," Arzubi adds. Those three generations include the 4M-, 16M- and 64M-bit chips.

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Plexus

CONTINUED FROM PAGE 51

images, text and alphanumeric data, according to the vendor.

"The P/90 provides an excellent development platform for XDP and Unix applications," said Paul Klein, president and chief executive of Plexus, in a press release. The P/90 is based on the 32-bit Motorola, Inc. 68020 microprocessor, running at 24 MHz, which is capable of performing 3 million instructions per second, according to Plexus.

The new processor allows expansion from 2M to 16M bytes of main memory and up to 3.5G bytes of magnetic disk storage. It also offers a standard small computer systems interface for I/O.

The P/90 is available immediately through Plexus sales offices and distributors at a base price of $29,500.

NEW PRODUCTS

Processors

A quad-width backplane replacement assembly for the Digital Equipment Corp. Vaxstation II/RC has been introduced by **Zoltech Corp.**

According to the vendor, the **H9278-BP** provides usable connectors for all eight slots in the DEC BA23 chassis, thus giving the Vaxstation/RC model the same capacity as the standard DEC Vaxstation II.

The H9278-BP costs $269.

Zoltech, 7023 Valjean Ave., Van Nuys, Calif. 91406.

CAD/CAM/CAE

An integrated design system featuring the tools needed to design and test digital signal processing (DSP) systems has been announced by the Computer Aided Engineering Systems Division of **Tektronix, Inc.**

The **Signal Processing Worksystem** (SPW) uses Tektronix's Designer's Database Schematic Capture package, Functional Block Library and Instrument Interface Library. It also features a Signal Display Editor (SDE) and a Simulation Program Builder that automatically compiles the block diagram with attached input signals into a simulation program and executes it. The resultant output signals are examined and analyzed by the SDE to verify the DSP system design.

The SPW costs $49,500 including an Apollo Computer, Inc. DN3000 workstation or a Digital Equipment Corp. Vaxstation 2000 workstation.

Tektronix CAE Systems Division, P.O. Box 4600, Beaverton, Ore. 97076-4600.

Graphics systems

A family of raster display systems featuring dual-resolution color capability has been introduced by **Seiko Instruments U.S.A., Inc.'s** Graphic Devices & Systems Division.

The **GR-4400 Series Advanced Raster Display Systems** each include a monitor, a microprocessor-based controller unit and a keyboard. They offer a resolution of 1,280 by 1,024 pixels with 1,024 displayed colors in normal mode and 640- by 512-pixel resolution with 16 million displayed colors in full-color mode.

The GR-4406 performs two-dimensional wire-frame transformations at a rate of 300,000 vectors per second; the GR-4416 performs three-dimensional wire-frame transformations at 400,000 vectors per second.

Prices range from $20,950 to $52,000.

Seiko Isntruments, 1130 Ingwood Court, San Jose, Calif. 95131.

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Data storage

A **high-performance disk-controller cache** has been introduced by **Hewlett-Packard Co.** for its HP 7936H 307M-byte and HP 7937H 571M-byte disk drives.

According to the vendor, the controller cache was developed specifically for system performance improvements. It has 2M bytes of read cache and 4K bytes of nonvolatile write cache. A copy of frequently requested data is maintained in random-access memory. Another feature is simultaneous read during write.

The controller cache as an upgrade to the drives already in the field costs $3,250. Included with the drives, it costs $15,500 for the 307M-byte drive and $19,600 for the 571M-byte drive.

HP, 1820 Embarcadero Road, Palo Alto, Calif. 94303.

Terminals

A personal computer-based cash register system designed for point-of-sale applications has been announced by **POS Technology, Inc.**

The **POS Technology cash register** includes a 25-line by 80-col. 12-in. monochrome display, a 5¼-in. 360K-byte floppy drive, an 8-MHz Intel Corp. 8088-2 CPU, a cash drawer, a real-time clock, a 40-col. printer, a 150W power supply and a 640K-byte memory.

The base unit costs $1,995.

POS Technology, 103 E. Pierce, Tempe, Ariz. 85281.

Input devices

A family of document analyzers offering the capability to convert scanned raster data into industry-standard vector or compressed raster formats in real time has been announced by **Ana Tech Corp.**

The **Vana Document Analyzers** offer user-selectable vector output formats including Ana Tech VSOF and Autocad DXF. Raster output formats include CCITT Group 3 and 4 and Interleaf raster.

Five models are available: The Vana 1000 (raster) and the Vana 2000 (vector/raster) interface with Ana Tech's 16- to 64-in. Eagle document scanners. The Vana 2010 (vector/raster) and the Vana 1010 (raster) interface with other scanners. The Vana 3000 enables integrated workstations to process either raster or vector data without affecting the scanner workstation.

Prices start at $15,000.

Ana Tech, 10499 Bradford Road, Littleton, Colo. 80127.

Computer crime law: A capitalist tool?

The courts seem to be ignoring the rights of 'usees' — those who rely on computer operations

BY J. J. BUCK BLOOMBECKER

Whom does computer crime law protect? Despite the existence of computer crime laws in the federal system and in 48 states, almost no one has given this basic question much attention. Unfortunately, the first authoritative statement from an appellate court on the subject is a rather curious proof of the old legal maxim, "hard cases make bad law."

The May 22, 1987, opinion in *Mahru* v. *Superior Court* (No. B026004. Second Dist., Div. Two) suggests that only owners of computer systems are protected against malicious damage to computer systems under the language of the California Penal Code Section 502 (c). Since the language is similar to that of most of the computer crime laws in the U.S., it seems worthwhile to explore the paucity of reasoning that seems to underlie the court's conclusion.

In the opinion of the court, the following facts were presented:

Mahru, identified in the court's opinion as "an experienced computer programmer, . . . an employee, director, and 15% shareholder of BHI," referring to his employer, Bruce Hegardt, Inc., was charged with computer crime after a dispute between BHI and the Downey Schools Federal Credit Union in California. In 1983, the credit union bought a computer and software and then sold both to BHI on credit, retaining a security interest. BHI contracted to provide on-site data processing services to the credit union. The computer was located at the credit union, the space being leased to BHI.

The charge of computer crime arose out of a dispute between the credit union and BHI.

In February 1985, the credit union orally and unilaterally terminated its contract with BHI. A provision of the contract required a written notice of 182 days before termination could ensue.

The parties attempted to negotiate an agreement to cover the time period in which the credit union would convert from BHI to another DP service. The attempt was unsuccessful. Within two weeks of the contract termination, the negotiations had broken down.

KAREN STOLPER

Shortly thereafter, Mahru gave BHI's chief computer operator written instructions to make specified changes in the names of two files in the computer. The court found that "the effect of these changes was to make doubly certain that credit union employees, none of whom were computer experts, would be unable to run the credit union's programs without assistance from either BHI personnel or another expert computer software technician." The credit union was not able to use the computer system for five days as a result of the changes in the file names.

Based on these facts, Mahru was charged with violating a section of the California Penal Code, making "any person who maliciously accesses, alters, deletes, damages, destroys or disrupts the operation of any computer system, computer network, computer program, or data" guilty of computer crime.

The court of appeals found no legal basis for this charge:

"From the evidence, the magistrate had reasonable cause to suspect petitioner accessed, altered and disrupted the operation of the computer system and programs. . . . The facts also support a suspicion that petitioner desired to vex and annoy the credit union and to injure it by putting it to additional expense in retaliation for its termination of BHI's contract."

Normally, a court finding that the behavior of a defendant falls within the language of a criminal statute upholds a criminal charge against that defendant. This court, however, chose to be

BloomBecker is director of the National Center for Computer Crime Data, a nonprofit organization in Los Angeles.

- **Do laws protect only computer owners?**
- **Spite is not a criminal offense**
- **Legislation for the rich and powerful**

more creative. "The question presented, though," it explained, "is whether the court should blindly match the literal words of . . . [the California Penal Code] to the facts of this case. We think not." Using a rationale that finds support nowhere in the case law or in the voluminous records of hearings of the California and other computer crime laws, the court drafted a new requirement onto the law against computer crime.

In the language that makes this opinion most troublesome, the court said: "Section 502 (c) cannot properly be construed to make it a public offense for an employee, with his employer's approval, to operate the employer's computer in the course of the employer's business in a way that inconveniences or annoys or inflicts expense on another person."

Why in heaven's name not?

There seem to be two bases on which the court is relying to rule against Mahru's punishment, although his behavior fits within the literal meaning of the computer crime law. Neither, I suggest, is adequate.

- Does the computer crime law prohibit annoyance or spite?
- Can users do no wrong? Have "usees" no rights?

The court's first argument is a unique red herring. The California Penal Code defines "maliciously" as importing "a wish to vex, annoy or injure another person, or an intent to do a wrongful act." Spite appears nowhere in the definition.

Yet it is about spite that the court seems determined to speak: "The legislature could not have meant, by enacting Section 502, to bring the Penal Code into the computer age by making annoying or spiteful acts criminal offenses whenever a computer is used to accomplish them. Individuals and organizations use computers for typing and other routine tasks in the conduct of their affairs, and sometimes in the course of these affairs they do vexing, annoying, and injurious things. Such acts cannot all be criminal."

Granting the court's premise, one would hope the court would proceed to explain its conclusion by referencing the test case it used to determine whether the acts in question were criminal. No reasoning along this line follows the court's rather general comment.

I DOUBT that many readers of *Computerworld* would find a five-day stretch of computer inoperability a minor wrongdoing worth calling no more than spiteful or annoying.

One must assume that the court took upon itself the role of a fact finder and decided that, although some other acts might be criminal, Mahru's were not. I would suggest that, normally, and properly, such factual determinations are better reached after a trial. At the trial, evidence can be offered that would allow a judge or jury to determine whether the charges involved petty nastiness or serious damage. The appellate court is poorly placed to make such a determination, having a limited record before it.

One wonders what the justice who wrote this opinion would think if his work had to be done by hand for five days rather than on the word processor his secretary probably used to produce drafts of the opinion issued by the court. I doubt that many readers of *Computerworld* would find a five-day stretch of computer inoperability a minor wrongdoing worth calling no more than spiteful or annoying.

Wrongs and rights

Can users do no wrong? Have "usees" no rights? Though the appellate court seemed to rely on the idea that the law does not protect people against spite, implicit in its emphasis on Mahru's status as an employee of BHI is the idea that computer crime laws were passed to protect only computer owners and legitimate users.

Let's ignore the fact that the credit union paid for the computer. Let's ignore the fact that it

ultimately got possession of the computer when BHI went bankrupt. Does the court really mean to say that the cloak of employment is a defense for any employee who goes into a computer system to "annoy, vex, or injure" anyone other than the employer?

Try this hypothetical scenario if you find the court's reasoning at all persuasive: I sue my bank. Counsel for the bank instructs the DP department to remove my account from its computer system. Is the fact that the bank owns the computer s complete defense for any employee who actually implements the instruction and removes my account? I suggest not.

DOES THE court really mean to say that the cloak of employment is a defense for any employee who goes into a computer system to "annoy, vex, or injure" anyone other than the employer?

The fundamental flaw in the court's reasoning lies in the fact that it has ignored the rights of "usees," or people who rely on the operation of computer systems. We are all usees of many computer systems. Perhaps the credit union terminated its agreement in bad faith. Does that mean it forfeited all rights to computer security just because the title was BHI's and not the credit union's?

If our computer crime laws are understood to protect only the owners of computer systems and not those who are also vulnerable to computer crimes, the laws are examples of legislation that protects only the rich and powerful, not the millions of others who are at risk without the resources to buy their own computer systems. I don't believe the computer crime laws were designed to be such capitalist tools.

Guilty or innocent?

The question is, should Mahru be punished?

Having suggested that the court badly misunderstood the intent of the computer crime laws, let me conclude by noting that I'm not convinced Mahru should be convicted of any crime or even that he should have been charged.

The court strenuously avoided looking at the rights of BHI and the credit union pursuant to its contract. I think this was a mistake. Perhaps BHI had a right to cease work altogether once the credit union breached its contract. Perhaps Mahru took reasonable steps to protect BHI's investment in the system software and data by doing what he did.

However, these are not the bases of the court's decision. They would more properly be decided at trial anyway. The sole point of this column is to warn computer users, and "usees," that the rights protecting these people against computer crime have been seriously limited by the language of this one case.

Despite *Computerworld's* announcement that the case bad been revived [CW, Aug. 3], on July 23 the California Supreme Court had, in fact, turned down s request for a hearing from the Los Angeles District Attorney's Office — making this case as dead as s doornail.

The opinion of the court of appeals now stands as the law of California. Since there are almost no other cases interpreting computer crime laws, it may represent s significant case.

As such, it represents the most significant limitation on computer crime laws any court has ever written. Let the "usee" beware. •

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MANAGEMENT

TAKING CHARGE

Efrem G. Mallach

Ask the right questions

"The biggest problem we have with computers," says Lou Fuchs, director of strategic products for Wang Laboratories, Inc., "is we don't know the questions to ask."

An MIS chief may disagree with Fuchs when the general ledger data base won't communicate with the new operating system release and the executive vice-president is breathing down his neck for the year-end figures and it's already Feb. 21.

But in the long run, Fuchs is right on target. If we can't figure out what questions we ought to ask, our chances of finding the right answers are near zero.

This does not mean that our MIS chief should turn to the executive vice-president and ask, "Are you sure you really need those year-end figures?" or "Wouldn't you rather have a distributor price list?" That way lie black eyes and hastily updated resumes. It does mean that, in the final analysis, somebody has to sit down and figure out what questions should be asked.

There are reams of data elements from internal and external sources that can be placed in a data base. Myriad reports, summaries, tabulations, graphs, analyses and breakdowns can be

Continued on page 63

Bank tests recovery scheme

Personnel issues come to forefront in disaster recovery dry run

BY DAVID A. LUDLUM
CW STAFF

While it was a true disaster for several computer centers, for others, the torrential rainfall that inundated the Chicago area earlier this month pointed to the potential value of giving disaster recovery plans a dry run.

That lesson was not lost on managers of Horizon Bancorp in Morristown, N.J. The facility conducted a mock disaster at one of its two data centers earlier this summer. Horizon officials said that among American banks — which the U.S. comptroller of the currency requires to maintain disaster recovery plans — its mock disaster was one of the first during normal working hours without prior notification to employees.

Through the exercise, the data processing staff discovered some stumbling blocks in Horizon's disaster recovery plan and raised the awareness of the recovery issue within other departments, according to John Cronin, the company's vice-president and director of computer operations.

John Cronin

"It's the only way that you really can evaluate the effectiveness of the plan. Just like developing a system, you can do all the testing you want, but until you put it in live production, you don't know how successful it will be," Cronin said.

Just talking to Horizon's legal, personnel and transportation officials about their responsibilities under the plan was important, Cronin added. "It really was an education in getting people to realize that we do have something like this in place," he said.

Horizon operates two data centers that provide partial backup for each other, the main one in Parsippany, N.J., and the other 100 miles away in Moorestown, N.J. Each has an IBM 4381 Model P13 operating under IBM's DOS/VSE and VM. The company also has a contract with Comdisco Disaster Recovery Services, Inc. for use of its Carlstadt, N.J., hot site, which is just 30 miles from Horizon's Parsippany data center.

Cronin, who began Horizon's disaster recovery planning with help from consulting firm Devlin Associates, Inc. several years ago, said he got the idea for a mock disaster at a Comdisco conference, where he was told that only 1% of organizations with a DP disaster recovery plan had conducted such an exercise.

Not quite the real thing

For Horizon's drill, Cronin chose a "less than worst case" event and time: loss of the Parsippany mainframe because of an electrical fire, but no loss of facilities or peripheral equipment, at 10 p.m. on a Thursday. "We did not want to disrupt the normal processing of the bank. That would be expecting too much to attempt something like that," he said.

But the timing did require employees who had worked during the day to be called in; some reported to the Carlstadt hot site and some to the Moorestown center.

Horizon holds announced disaster recovery tests three or four times a year and had identi-

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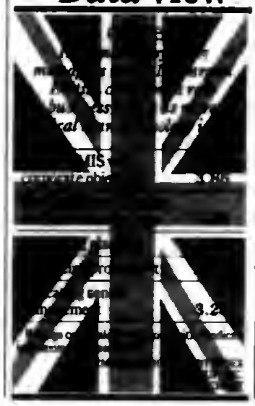
Data View



New Chase service group melds business with MIS

BY DAVID A. LUDLUM
CW STAFF

NEW YORK — The Chase Manhattan Bank NA recently organized a variety of services that depend on data processing into a profit center headed by the executive who previously led the firm's corporate operations and systems department.

In heading up the new Service Products Sector, Michael Urkowitz moves from direct responsibility for the bank's technological direction to a role dominated by business concerns. He will oversee services that provide 10% of the bank's revenue.

In a telephone interview, Urkowitz, 44, attributed the promotion to his combination of technology and business duties while he was in charge of corporate operations and systems.

Urkowitz dealt with technology issues such as establishing the architectural framework to integrate the bank's systems around the world. He also faced business concerns involving delivery of services, such as responding to increased competition and regulation.

"We recognize that the management disciplines needed to run these businesses include the disciplines needed to run operations and systems," he said. "You must be capable of driving the technology in order to be successful, to have the ability to put in place, on a large scale, the technologies needed to differentiate yourself in these businesses. You really can't separate the technology from the business for these activities."

This outlook has led to the creation of opportunities for systems managers at Chase to move into product development, marketing and even sales, Urkowitz

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MANAGERS ON THE MOVE

Blue Shield DP exec moves into administration

Daniel H. Thomas, former vice-president for systems and data processing at **Pennsylvania Blue Shield**, has been appointed the insurer's senior vice-president for administration and planning.

In addition to DP, telecommunications and office systems, his new position includes responsibility for strategic ventures, administration of corporate and interdepartmental projects and company buildings and property.

Thomas, 53, said the move from the systems realm to a broader, administrative role has been a natural, evolutionary one. Experience in planning DP lends itself to corporate planning, and the use of computer technology in building controls and other areas has provided him with significant involvement with building facilities, Thomas said.

He said his DP role now focuses on reviewing and approving an annual strategic systems direction and tying that path to corporate strategy and, "of course, the budget." Day-to-day managing is kept to a minimum, particularly fighting crises. "We try to avoid that," he said.

Thomas has set up a performance management reporting system that tracks the status of systems development, maintenance, hardware and other areas.

He studied education, math and science as an undergraduate and started his career with Burroughs Corp. in military field service. He said his interest shifted toward business, which he studied through an executive education program at the University of Pennsylvania's Wharton School.

Thomas has spent 15 years with Pennsylvania Blue Shield, which is the largest Blue Shield Plan in the U.S.

Daniel H. Thomas

Peter Kieran has been named director of MIS at **Lonza, Inc.** in Fairlawn, N.J., a manufacturer and marketer of specialty chemicals with plants in seven states.

In his new position, Kieran is responsible for development and operation of business information systems, reporting to R. Brian Cassidy, the company's vice-president for finance.

He had been director of MIS at Essex Chemical Corp. and manager of MIS at General Cable Co. He graduated from New York University with a bachelor's degree in computer science and from Rensselaer Polytechnic Institute with a master's degree in computer science.

Continued on page 68

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MEMOREX

BOOK REVIEWS

Portrait brings CDC founder Norris into focus

BY STANLEY GIBSON
CW STAFF

William C. Norris: Portrait of a Maverick
By James C. Worthy

At a recent trade conference, I sat at lunch next to a couple from Minneapolis. Since we were all concerned with computers in our work, talk turned to a Minneapolis company, Control Data Corp. The couple expressed dismay at the firm's recent performance but optimism that with founder William C. Norris having left it, better times might be ahead.

Such is perhaps the common opinion that has surrounded Norris in the past several years; that he is an irascible, autocratic eccentric who overstayed his welcome and nearly ran a billion-dollar company into the ground.

Worthy's book sets out to correct that perception and succeeds in putting Norris in perspective. The book, while admiring, is not unduly flattering — even though the author is a long-time acquaintance of Norris and a CDC board member.

Indeed, a person who has been roundly criticized in recent years deserves also to have his achievements mentioned. The book reminds us that Norris was a pioneer in time-sharing, the third-party peripherals business, supercomputers and third-party maintenance.

But what caused CDC's problems? Was it Norris? The book paints a picture of a combination of factors, all feeding on one another: the timing of new products, production quality, personal computers and, to a certain extent, Norris's personality.

Norris's problem, one which caused him periodic difficulty throughout his career, was communication, an activity at which he concentrated little and hence never became skilled. The result was that Norris's purposes and methods were not always understood by subordinates.

One who could understand him, long-time lieutenant Norbert Berg, acted as a "human interface," translating Norris's wishes to those who hadn't a clue.

Indeed, Norris will never he remembered for any of the quotes attributed to him in this book; they are prosaic to the extreme. After finishing the volume, one is hard-pressed to recall any of Norris's statements.

However, the key to understanding Norris is not through words but through emotions. The book shows that he is first moved emotionally, as he was by the urban riots of the 1960s. Later, he found a way of translating that emotion into a path of action — usually a business venture, such as the factory built in the Northside ghetto of Minneapolis.

And public opinion could he swinging back to sympathy for Norris's values. A few years ago, aggressive dealing and the raw pursuit of wealth were glorified. Now, some Wall Street wizards have been exposed as criminals.

Although brief at 230 very readable pages of text, Worthy's book is not devoid of intriguing anecdotes, such as the way in which the settlement between IBM and CDC was reached as a result of CDC's lawsuit. Norris and then IBM President Thomas V. Learson flew secretly to Omaha, Neb., to begin negotiations, the book recounts. The talks continued, with Norris taking the code name Bird and Learson the name Link.

Norris, who does not seem a particularly mischievous or fun-loving sort, at least on the surface, told me in an interview that the most fun he had at CDC was in winning the IBM settlement, in which IBM ceded its service bureau to CDC.

For people not acquainted with Norris or the computer industry, this book is a good first look at Norris and his role. And the uninitiated will not he deterred by its length. But those who follow the industry closely could find the book somewhat unsatisfying. There is probably another book waiting to be written that could he titled *Control Data: The Inside Story.*

Hardcover, $19.95, 259 pages, ISBN 0-88730-087-1, by Ballinger Publishing Co., Cambridge, Mass.

Books in Brief

Desktop Publishing and Typesetting
By Michael Kleper

A comprehensive source book ranging from the mechanics of typesetting to the availability of hardware and software packages, plus the principles of layout and design.

Paperback, $29.95, 770 pages, ISBN 0-8306-0700-5, by Tab Books, Inc., Blue Ridge Summit, Pa.

Micro-Mainframe Connection
By Thomas Wm. Madron

The basic issues and technologies related to the simple concept and complicated reality of linking micros to mainframes.

Hardcover, $29.95, 260 pages, ISBN 0-672-46583-3, by Hayden Books, Indianapolis, Ind.

Publishers wishing to have their books considerd for review can direct books, prepublication galleys, press releases, catalogs or other information to George Harrar, Book Review Editor, Computerworld, P.O. Box 971, 375 Cochituate Road, Framingham, Mass. 01701.

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Questions

FROM PAGE 59

derived from even the simplest data base. Which data elements are worth the trouble to enter and store? Which outputs are worth having? These are the two basic questions that every MIS shop must answer.

Some answers are obvious. Paychecks must go out to avoid a riot. IRS forms must go out to avoid other problems. Invoices must go out or checks won't come in.

The basics are cut-and-dried in 1987. You can cart them to the local Accounting Corporation of America office and kiss them good-bye. If you keep them, they should occupy only a small fraction of your staff, your mind and your CPU cycles.

Management reports are not that simple. Here, there are no givens, no absolutes, no government regulations to guide you gently along the paths of righteousness. Here, people are left to their own devices. Here, heeding one executive's "Spare me this detail" begets another's "Where are the facts I need?" Here, the cries of "Useless" and "Too much" or "Too little" and "I can't understand this report" or "Could you just change this one teensy thing?" are heard the loudest. And here, Fuchs hits the bull's-eye.

Take aim

Fortunately, heads of MIS need not shoot from the hip. There is a concept through which they and top management, working together, can jointly define their information needs for the purposes of management control. This concept is called Critical Success Factors (CSF).

It was first publicized in an MIS context by MIT's John Rockart in a 1979 *Harvard Business Review* article, although in a general management context, the concept goes back to 1961 and the term to 1972.

Rockart defines CSFs as "the limited number of areas in which results, if they are satisfactory, will ensure successful competitive performance for the organization." The CSFs for a supermarket might include inventory; for a hospital, cost accounting.

How does one define the CSFs for a firm's executives? Through discussion, critical questioning and refinement.

Rockart points out the following things to expect:

- Some CSFs depend on the industry, some on a firm's position in its industry.
- Some CSFs are relatively permanent, some are temporary.
- Many CSFs cannot be monitored via traditional financial accounting systems. Many cannot be monitored via any single existing data base. Some cannot even be monitored solely via an organization's internal information.
- Some CSFs are objective, some — though fewer than it may at first appear — require subjective measures. This may make MIS managers uncomfortable, but not top executives.

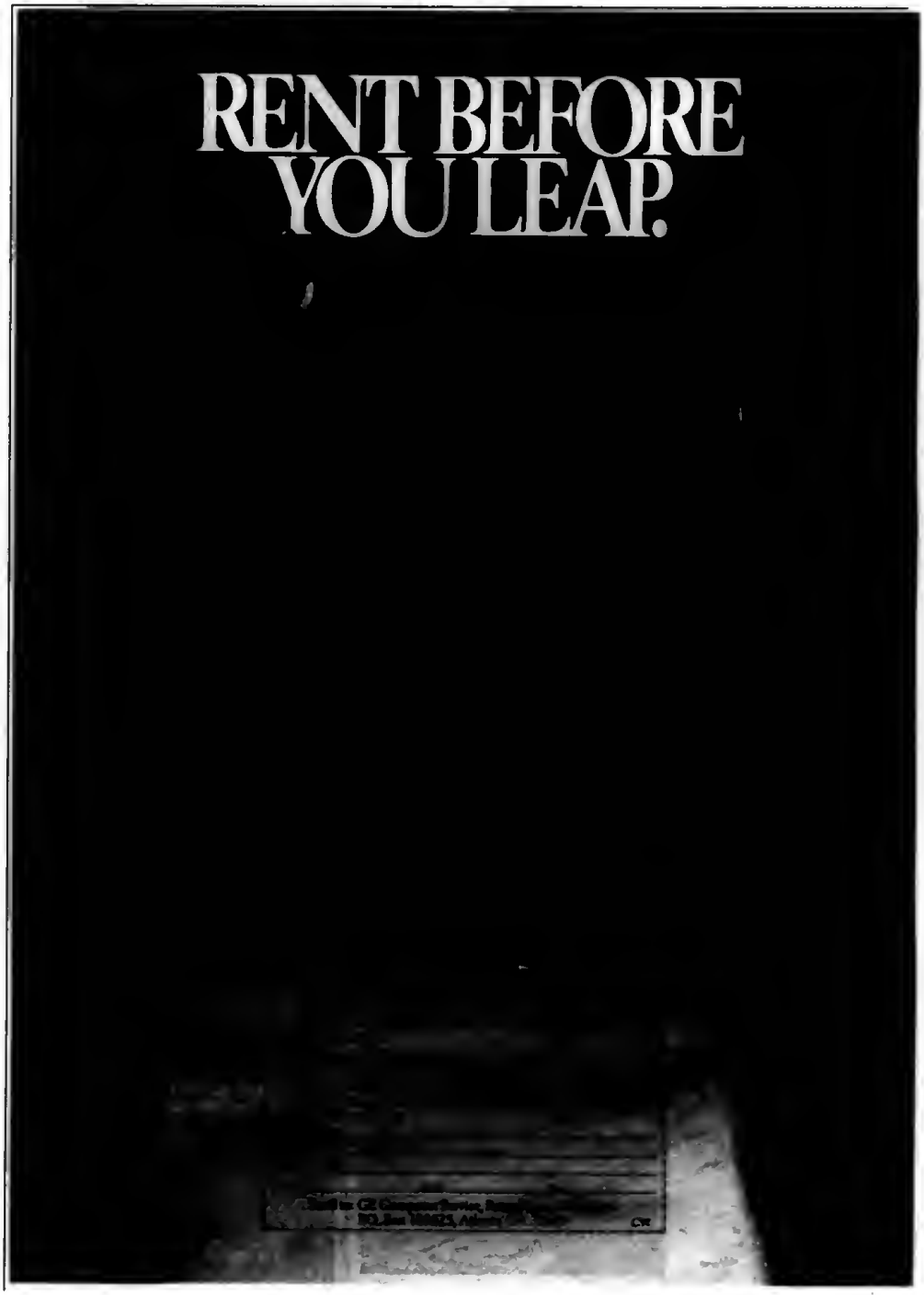
Once the CSFs are defined, MIS managers and senior executives work jointly to determine how they will be measured and what the corresponding reports will look like.

MANAGEMENT reports are not simple. There are no givens, no absolutes, no government regulations.

The result is that executives get the information they need to manage their organizations effectively. But there is more than that.

The process gives executives more insight into their real information needs and gives MIS managers more insight into how their organization really functions in its environment. These shared insights, in the final analysis, can be the most valuable benefit of all.

Mallach teaches at the Boston College School of Management and is a consultant to user and vendor executives.



Chase

FROM PAGE 59

said. "We're already in the habit of involving DP executives on sales calls. That's been effective," he said.

Business background

As an example of the business issues he faced, Urkowitz cited the handling of large payments between corporations and other banks.

This activity, he said, involved both increased competition and greater regulation as the Federal Reserve Board tightened controls on the short-term overdrafts banks can maintain with the board.

Urkowitz said Chase adopted a strategy of "reautomation" to meet the challenges by improving efficiency, boosting capacity and providing systems that generate additional information on the overdraft positions of the bank and its customers.

Urkowitz's new sector brings together wholesale services provided to corporations and other banks. These include relatively innovative services, such as electronic banking and delivery of financial information, as well as more conventional bank functions, such as check processing and transfer of payments.

The sector, which was formed Aug. 20, is aimed at making the services' contribution to the bank more visible and at bolstering efforts to enhance that contribution, according to Urkowitz. "There is substantial growth potential that can be derived by a strong focus on these businesses," he said.

Urkowitz, who remains an executive vice-president, is succeeded as chief of corporate operations and systems by John Scicutella, who has been appointed executive vice-president.

Michael Urkowitz

Scicutella was previously Trading & Treasury Services Group executive. He joined Chase as an operations trainee in 1970, then managed account information and loan operations.

Urkowitz started with Chase in 1974 in the controller's department. He then joined operations, working in check processing. Later, he managed a money transfer group, an international bank services group, product and production risk management, international operations and corporate operations and systems.

Technology background

Urkowitz earned bachelor's and master's degrees in mechanical engineering from the City College of New York and worked for Grumman Corp. as a project engineer. He also worked for the city of New York, both on the mayor's project management staff and as assistant to the deputy commissioner for New York's Housing and Development Administration.

Urkowitz said he has carefully studied technology and business issues at Chase through courses, seminars and contacts. "I drove myself to understand the underlying business we were doing," he said. "I struggled to see the whole of it, with regard to customers. I found the opportunities boundless and limited only by my own energy and willingness to learn."

CALENDAR

SEPT. 6-12

Banque '87 — The 6th European Trade Fair for Techniques and Organization in Banking. Copenhagen, Sept. 7-9 — Contact: Bella Center A/S, Center Blvd., 2300 Kobenhavn S, Denmark.

SIBOS: SWIFT's International Banking Operations Seminar. Montreal, Sept. 7-11 — Contact: Society for Worldwide Interbank Financial Telecommunication S.C., Ave. Ernest Solvay 81, B-1310 La Hulpe, Belgium.

12th Annual National FSI User Conference. Dallas, Sept. 8-11 — Contact: Forum '87, Suite 700, 2777 Stemmons Freeway, Dallas, Texas 75207.

Decworld '87. Boston, Sept. 8-18 — Contact: Digital Equipment Corp., 200 Baker Ave., Concord, Mass. 01742.

OSI Meeting for Government Users. Gaithersburg, Md., Sept. 9-10 — Contact: Joan Wywra, Room B218, Building 325, National Bureau of Standards, Gaithersburg, Md. 20899.

Financial Investment Management Exposition and Conference. New York, Sept. 9-10 — Contact: Flagg Management, Inc., P.O. Box 4440, New York, N.Y. 10163.

1987 Capital Microcomputer Users Forum. Washington, D.C., Sept. 9-10 — Contact: National Trade Productions, Inc., Suite 400, 2111 Eisenhower Ave., Alexandria, Va. 22314.

The Desktop Publishing Conference. Santa Clara, Calif., Sept. 9-12 — Contact: Seybold Seminars, 6922 Wildlife Road, Malibu, Calif. 90265.

Distribution/Computer Fall Expo '87. New Brunswick, N.J., Sept. 10-11 — Contact: C. S. Report, Inc., P.O. Box 453, Exton, Pa. 19341.

SEPT. 13-19

Atre Annual Forum on Data Base. New York, Sept. 14-16 — Contact: Atre International Consultants, Inc., P.O. Box 727, 16 Elm Place, Rye, N.Y. 10580.

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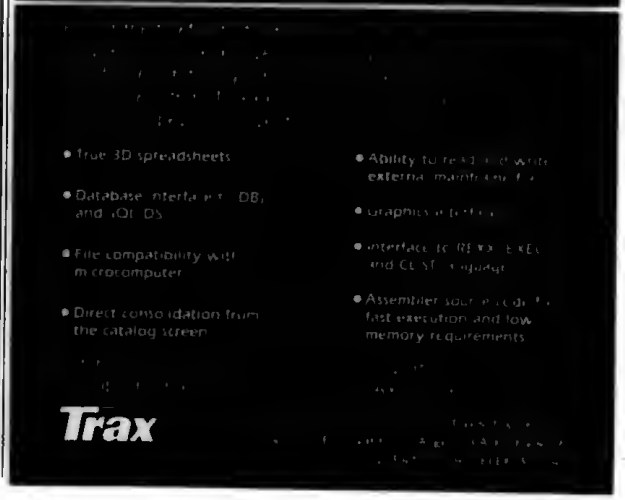

For those analyzing developments in the PC industry, Compaq offers an executive summary.

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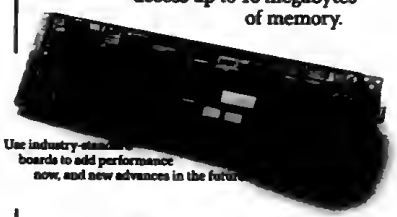

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Recovery

CONTINUED FROM PAGE 59

fied an unannounced test as an objective, so some employees were prepared for it, according to Cronin. "Some were not tremendously surprised when they got the call, because they felt it was imminent," Cronin said.

Horizon ran its targeted high-priority and supporting applications at the hot site. These applications included demand deposit, savings, on-line trust accounting, customer information, customer service, returned checks and general ledger. Checks were processed and statements were printed at the Moorestown center.

One of the hitches that arose was a lack of personnel. The supervisor of check processing for the day shift was on vacation, and the supervisor for the evening shift had left earlier because his wife was ill. Designated backups were able to assume their responsibilities, however.

Most processing ran smoothly, although two applications at the hot site had to be modified to reflect recent changes to the Parsippany systems, even though Horizon updates its disaster recovery plan quarterly. "That's why we have a need for continuous testing at the recovery center," Cronin said.

These problems were corrected within 24 hours, as required in the recovery plan. Communication with Comdisco suggested that a replacement processor could have been en route the day after the disaster was declared and installed within three days, also according to the plan, Cronin said.

The problems that arose were inevitable, he said. "In the event of a real disaster, those things are going to surface. We recognize that we're never going to have everything work perfectly, and we're never going test everything perfectly."

Employees the key element

Legal concerns and issues of employee relations constitute a major part of the Horizon recovery plan and accounted for much of the managerial effort during the mock disaster.

The personnel department was required to send a representative to the Comdisco hot site to monitor employees' hours and working conditions, assure them of adequate relief and contact their families when necessary.

Although salaried employees received no additional pay for the recovery work, no one complained about the extra duty; rather, many welcomed the challenge, Cronin said.

"From a morale perspective, it could not have been better. Some of the people we even had to tell to go home because they had worked enough. I think some were as anxious to do this as I was." Cronin said he does not know exactly how much the mock disaster cost, but he called the expense minimal, in part because the affected data center is only 30 miles from the Comdisco hot site and because hotel rooms that Horizon reserved were not used.

In a curious coincidence, a few hours after the mock disaster was declared an air conditioner in the data center involved began leaking water that, if unnoticed, might have caused the sort of fire that the mock disaster simulated.

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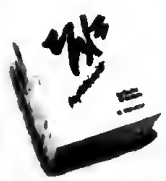

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Managers

CONTINUED FROM PAGE 59

Jack Foley has been appointed to the newly created position of information systems manager at **Crazy Shirts, Inc.** in Honolulu.

Foley will oversee the development and organization of Crazy Shirts' data processing environment, focusing on the use of personal computers, office automation, telecommunications, computer-aided design, graphic arts and point-of-sale systems for retail stores.

With 18 years of experience in the DP field, Foley has been owner of Information Management Consultants, a project manager at The Hertz Corp., a division MIS manager at General Instrument Corp. and a user support manager for the Kamehameha Schools/Bernice P. Bishop Estate.

McGovern funds MIS chair at MIT

Computerworld founder Patrick J. McGovern has donated $1.5 million to MIT to fund a professorship in management information systems at MIT's Sloane School of Management.

McGovern, 50, is a 1959 graduate of MIT, where he majored in biophysics and studied artificial intelligence and the application of computers to the life sciences. He also was active with the school newspaper, *The Tech*.

McGovern said he hopes the chair will go to someone with an interest in the effective use of information systems in organizations and in the impact of computer-based systems on the management of corporations and institutions. A search committee will recommend candidates for the occupant to the school's dean.

McGovern lauched market research firm International Data Corp. in 1964 and CW in 1967. The newspaper is part of IDG Communications, Inc., publisher of more than 80 computer publications around the world. Both firms are units of International Data Group in Framingham, Mass., of which McGovern is chairman.

COMPUTER INDUSTRY

INDUSTRY INSIGHT

Clinton Wilder

Intimidation by litigation

IBM may soon be unveiling its most powerful machine to the rest of the computer industry. The machine that Big Blue is readying isn't really new, but rather is the latest embodiment of a long-held corporate strategy with a few new wrinkles that the company hopes will enhance its market success.

But the machine is not a mainframe, a mid-range system or a microcomputer. It's not a computer at all. It is IBM's legendary legal machinery, which may be cranking up for action on the battleground of the Personal System/2 market.

Ever since IBM started losing personal computer market share to the clones and speculation about the PS/2 (PC/2 in the rumors of those days) began, a big part of the equation was the question of how proprietary the new microcomputer generation would be. Developers of everything from operating systems to microcode to expansion slots asked, "How easy will it be to clone?"

But for those executives who take the developers' technology to market, the more pertinent question was, "How easy will it be to clone without being sued?"

As if the intricacies of IBM's Micro Channel and OS/2 Extended Edition weren't tough enough, the answer to the latter question lies in the much more uncertain netherworld of anticipating IBM's mind-set. No one has to be reminded what the "U" in FUD stands for.

In recent weeks, IBM has launched the first salvo from its new machine. In federal court in California, Big Blue has filed trademark infringement lawsuits against micro board makers AST Research, Inc. and Orchid Technology, Inc. IBM claims that two AST add-on boards for the PS/2 — the Rampage/2 and the Advantage/2 — violate the PS/2 trademark. It alleges that Orchid cited the PS/2 in its advertising without acknowledging

Continued on page 75

Western Digital back in the saddle

Chips and peripherals maker finds diversification a successful formula

BY JAMES A. MARTIN
CW STAFF

IRVINE, Calif. — Fifteen years ago, Western Digital Corp. started manufacturing memory chips for calculators. Today, after years of on-the-edge existence that climaxed with a mid-1970s filing under Chapter 11 of the Federal Bankruptcy Code, the company is showing new promise as a diversified supplier of semiconductors and microcomputer peripherals.

Western's Johnson

"Western Digital has become highly successful at developing a broader range of products," said Andrew Neff, who follows the company for Montgomery Securities in San Francisco.

Western Digital recently added a new angle to its strategy through a joint manufacturing and marketing deal with Tandon Corp. Funded by a $12 million loan from Western Digital, the two firms will make 3½-in. Winchester hard disk drives for microcomputers made by Tandon and other vendors (CW, Aug. 24).

"They've acquired someone to make graphics controllers, they've acquired a company that

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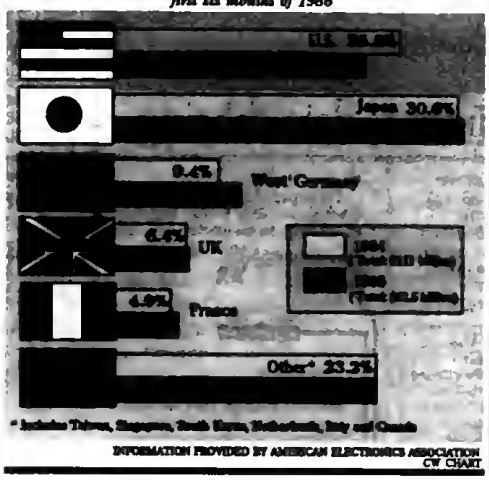
Data View

U.S. electronics exports slip

U.S. share of 11-country export totals declined 3.1% from 1984 to the first six months of 1986



* Includes Taiwan, Singapore, South Korea, Netherlands, Italy and Canada

INFORMATION PROVIDED BY AMERICAN ELECTRONICS ASSOCIATION
CW CHART

Export rules to be lifted

Proposed exemption to cover 16-bit micros

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — The Reagan administration is preparing to lift U.S. export controls on microcomputers using Intel Corp.'s 8088 and 8086 chips and similar-generation microprocessors from Motorola, Inc. and Zilog, Inc., according to industry sources.

The practical effect of the move would be to remove the licensing delays involved in exporting microcomputers such as the original IBM Personal Computer and 8086-based IBM compatibles to U.S. allies and trading partners.

Continued on page 74

Apple joins Sybase investors

BY JULIE PITTA
CW STAFF

CUPERTINO, Calif. — Apple Computer, Inc. last week said it has made a minority investment in data base software company Sybase, Inc. in Berkeley, Calif.

According to an Apple spokeswoman, Apple is participating in a $3.3 million equity investment with a number of venture capital firms, all current investors in Sybase.

Plans call for Sybase to create a relational data base system for Apple's Macintosh.

Sybase's product plans are expected to aid Apple in its efforts to sell Macintosh computers to large corporations, the spokeswoman added.

A Sybase spokesman declined to offer details regarding the proposed product except to say it will be ready within a year.

Officials from both Apple and Sybase declined to quantify Apple's stake in Sybase. Among the other venture capital firms investing in this round of Sybase financing are Hambrecht & Quist, Inc.; TRW, Inc.; Kleiner Perkins

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Inside

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- 3Com agrees to pay license royalties for U.S. and foreign patents for networking technology. Page 70.

Bank experience valuable asset for Hogan CEO

BY ROSEMARY HAMILTON
CW STAFF

DALLAS — When Gary Fiedler recently stepped in as chairman and chief executive officer of Hogan Systems, Inc., users and industry analysts applauded his appointment, even though he had never worked for a software company before. One thing Fiedler has to offer is considered a critical success factor in Hogan's industry: nearly 20 years of experience as a banker.

"Understanding the industry is probably the most important aspect of being successful in a vertical market," said Terence Quinn, a software industry analyst at E. F. Hutton & Co.

Fiedler was recently named to replace George L. McTavish. McTavish, who left Hogan earlier this summer, is often credited with pulling the firm out of financial disaster a few years ago. He departed because of "philosophical differences," on which Hogan would not elaborate.

"I don't have any experience selling software, but I have bought an awful lot of it over the course of my career," Fiedler said. "I have been involved in operations and DP management where software was acquired. I know how it's sold."

Fiedler's most recent position was as chairman and CEO at

Hogan's Fiedler

First Interstate Bank of Nevada NA, which he joined in 1982.

His resume also includes various positions at two banks that are among the nation's largest and most prominent in banking MIS trends: Mellon Bank NA in Pittsburgh and Wells Fargo Bank NA in San Francisco. His last position at Wells Fargo was as chief of the cash management services division.

Fiedler said that, as a former banker, he expects to work well with customers. "I think they'll view me as a known quantity, and I think I can reassure them about the direction of the company," he said. "I think I can display an understanding of their problems, and I would think if they know I'm aware of what their needs are, that they should feel fairly comfortable."

Continued on page 75

3Com licenses Soderblom token-ring patent

BY STANLEY GIBSON
CW STAFF

SANTA CLARA, Calif. — 3Com Corp. announced last week that it has agreed to pay license royalties for the U.S. and foreign patents for token-ring technology held by Willemijn Holding BV, the Netherlands-based firm that holds token-ring patents granted to Swedish inventor Olof Soderblom and AT&T.

The licenses will allow 3Com to produce, market and distribute token-ring products without restriction and applies retroactively to 3Com's existing products based on the IEEE 802.5 token-ring standard, according to a prepared statement issued by 3Com.

Under the terms of the agreement, which remains in effect for the life of the patents, 3Com will pay Willemijn a royalty for all token-ring products purchased by 3Com customers. Soderblom's patent is effective until 1998; the AT&T patents expire next year.

The amount of the royalties was not disclosed, although the standard royalty rate on the Soderblom patent is 2.75% of the purchase price of token-ring products, a rate that decreases as the number of products increases. 3Com is also liable to pay 0.25% of a product's purchase price for the right to use technology covered by the AT&T patents.

Willemijn earlier this year acquired the AT&T patents, also known as the Farmer Newhall and Kerr patents, which are different from Soderblom's but similar enough to cause confusion among licensees, according to George Vande Sande, Willemijn's attorney.

Some 25 other companies, including Ungermann-Bass, Inc., NCR Corp., Hitachi, Ltd., Fujitsu, Ltd. and IBM have reached agreements with Willemijn. Willemijn is continuing to seek royalties from other vendors using the token-ring concept in their networking hardware.

Televideo, Zentec abandon merger

BY JULIE PITTA
CW STAFF

SUNNYVALE, Calif. — Merger discussions between terminal makers Televideo Systems, Inc. and Zentec Corp. collapsed last week, less than one month after an initial letter of intent was signed.

Officials at both companies indicated that the proposed merger was dropped by mutual agreement. However, both parties were reticent to offer reasons why negotiations stalled.

In a prepared statement, Televideo said the merger would not be in the company's "best interests."

Zentec President and Chief Executive Officer William D. Parker was also reluctant to offer specifics. "It was the consolidated opinion of both the management team and the board of directors that we didn't feel it was appropriate or within the best interests of the company to continue with the merger," Parker said. "There were issues that needed to be resolved."

Both companies have previously encountered difficulty in finalizing corporate alliances. Last year Televideo dropped plans to acquire Alpha Microsystems, Inc. after a letter of intent was signed.

Zentec last year announced plans to acquire keyboard manufacturer Stackpole, Inc. and Qume Corp.'s graphics terminals business. Zentec successfully purchased Lear Siegler, Inc.'s display terminals division last year, and Televideo recently acquired Delta Data Systems Corp.

The merger would have brought Televideo a number of OEM accounts for its terminals business. More than two-thirds of Zentec's terminals sales were to OEMs

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Sybase

CONTINUED FROM PAGE 69

Caufield & Byers; Charles River Ventures; and Oak Investment Partners.

Founded in November 1984, privately held Sybase markets a relational data base management system targeted at corporate and government users that is also sold through OEMs and value-added resellers. Currently, the Sybase product runs on Digital Equipment Corp. VAX systems and Sun Microsystems, Inc. workstations.

Richard Finkelstein, vice-president of the Codd and Date Consulting Group, said the Sybase and Apple alliance represents a good match. "Over the last two years, Apple has shown a better understanding of the corporate market and what they need to do to integrate their systems into the corporate environment," Finkelstein said. "An essential aspect of that is a full data base system that works well with mainframes and local-area networks."

Apple's investment was made through its Strategic Investment Group, established in May 1986. That group was responsible for the formation of Claris Corp., Apple's new software subsidiary. Claris reportedly will eventually spin off as a separate company.

Additionally, Apple has made equity investments in Forethought, Inc. in Sunnyvale, Calif., Touch Communications, Inc. in Scotts Valley, Calif., and others.

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Western

FROM PAGE 69

makes the logic chips that are placed with microprocessors, and they're getting into printer controllers," Neff said. "Western Digital is now in a position to make everything an OEM vendor needs for a microcomputer with the exception of the microprocessor."

Western Digital's revenue reflects the success of its diversification strategy. Sales in fiscal 1987, which ended in June, were $462 million, compared with $300 million in fiscal 1986. Net income was $48 million, more than twice the $23 million for the previous year. The company has projected sales of $550 million in fiscal 1988.

"Our acquisition strategy in accomplishing this goal has come about rather coincidentally," said Roger W. Johnson, chairman of the board, president and chief executive officer. "We found it best, in some cases, to acquire a company that had executed the strategies we were already pursuing."

For example, Western Digital was investigating the area of processor logic and found that Faraday Electronics in Sunnyvale, Calif., already had the products Western Digital was striving for. The situation was much the same with Paradise Systems, Inc. in South San Francisco, which is now Western Digital's video and graphics division and accounts for 10% of its current revenue. "We broadened the product range but minimized the dependency on any one large customer or segment," Johnson said. "Our customers can be anyone who makes something that computes."

Come a long way

Western Digital's current status is a far cry from the mid-1970s, when, beleaguered by Japanese companies aggressively entering the calculator market, the company was forced to seek bankruptcy protection. In 1978, Western Digital emerged from Chapter 11 stronger but apparently not wiser.

From the late 1970s until 1982, Western Digital suffered from delusions of grandeur and a lack of focus. "It was a $30 million company that thought it was a $1 billion company," Johnson said.

In 1982, the year Johnson took over the Western Digital helm, the company reported a net loss of $7 million. "It was my intent to make Western Digital profitable again by getting rid of all the things that were not central to our strategy — to stop those diversionary products and invest in some strong core businesses," he said. With the exception of fiscal 1985, when losses totaled $4.6 million, Western Digital has turned a profit every year since 1982.

In addition to supplying OEM contracts, Western Digital has been moving into direct marketing of microcomputer enhancements. The company recently announced the Filecard PS-30, a hard disk drive controller and 3½-in. hard disk on one card designed to compete with Plus Development Corp.'s Hardcard for the IBM Personal System/2 Model 30 market.

Western Digital sells products to practically every major microcomputer OEM concern, which removes the company from the performance highs and lows of particular vendors. "We don't really have to worry about who's winning," Johnson said. "We're the Delco battery company of the computer industry — we ship to everyone."

Three years ago, IBM was responsible for about 30% of Western Digital's annual sales and at one point had contributed as much as 50%. Today, however, some 30 OEM contracts constitute 60% of sales.

Export

FROM PAGE 69

The decontrol measure is not expected to cover Intel's more powerful 80286 chip. Although the move technically covers microcomputers using 16-bit chips, it is generally limited to less powerful computers using an 8-bit bus.

"Too little, too late"

William Chastka, vice-president of Washington Resources International, a computer export consulting firm in Washington, D.C., called the move "much too little and too late." He suggested that the effort was designed to derail industry-backed trade legislation that would decontrol 16- and 32-bit computers [CW, July 27].

Export controls are intended to prevent Soviet bloc countries from obtaining sensitive U.S. technology, but the controls can be lifted on grounds of "foreign availability" if the technology is widely available from other sources, such as Pacific Rim nations.

"About 12 months ago, the government decontrolled 8-bit computers, and now they're considering 16-bit computers because the market is going to 32 bits," said Charlotte LeGates, spokeswoman for the Computer and Business Equipment Manufacturers Association.

"There's not much fear the Russians will be guiding their missiles on a 16-bit computer," she added.

An announcement on removing export controls for 16-bit micros will be published in the "Federal Register," a daily bulletin published by the government, early next month, according to a spokeswoman for the Department of Commerce.

In a related move, the Reagan administration is expected to ask the Paris-based Coordinating Committee on Multilateral Export Controls (Cocom) to reduce Cocom restrictions on exports of low-end computers to Soviet bloc countries.

A U.S. interagency committee agreed to ask Cocom to remove controls on computers with the Commerce Department's processing data rate of 6.5 or less, such as micros based on the Intel 8088 chip, for export to Soviet bloc countries.

The current threshold is a processing data rate of 2. The Commerce Department's processing data rate is a formula to rate computer performance and is used to define products subject to export control regulations.

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Intimidation

CONTINUED FROM PAGE 69

it as a registered trademark.

Are these trivial matters? Maybe. Does the idea of a patent on "/2" merit a chuckle? Perhaps. But these suits could also be seen as a serious warning shot across the bows of the clone makers and the firms we'll call "vendors of IBM compatibility," such as Chips and Technologies, Inc. and Phoenix Technologies Ltd.

It wouldn't be the first time that a vendor, and not just IBM, launched a proprietary-protection lawsuit with the ancillary benefit of market intimidation.

But the situation is much more complicated than just IBM waiting to pounce.

There are many other factors to be weighed, including one even more powerful than IBM's attorneys: the power of the marketplace.

IBM could be running a substantial risk if its potential legal moves polarize the market in ways that could be detrimental to users. If IBM were to pick an expensive legal fight with Compaq Computer Corp., for example, one would be hard pressed to see how IBM or its users would benefit. The open architecture, IBM Personal Computer-compatible standard is well established and thriving.

In addition, with some exceptions, the cloners have become experts in finding ways to duplicate the IBM standard without "copying" it.

Phoenix Technologies uses what is known as the "legal clean room" technique. That is, the software developers who actually write Phoenix's IBM-compatible BIOS are not given access to IBM's source code, only to the specifications of the necessary BIOS functions. Phoenix thus believes it is on firm legal ground. Even though its BIOS does what IBM's BIOS does, it does so using a different software path.

Most vendors working on PS/2-compatible products would express confidence that their technology can stand the test of a patent infringement challenge. It is not the legal issue per se that is muddying the market waters right now but the question of whether a vendor wants to risk an expensive and attention-consuming lawyers' battle with IBM.

What parts of the PS/2 does IBM think are worth patenting? And which of those would be worth a court fight? Those are the questions that the microcomputer industry is trying to answer.

Until they are answered, there will be confusion, frustration and the specter of intimidation. Wyse Technology President Phillip White said in a recent *Computerworld* interview that his company would let someone else test the legal waters on a potential Micro Channel product.

Rest assured that Big Blue is more than happy to let those types of sentiments flourish.

Wilder is *Computerworld's* senior editor, computer industry.

Experience

CONTINUED FROM PAGE 69

This management strategy is welcomed by observers, who have long held the criticism that most banking software vendors do not have a good enough understanding of the business they are intended to serve.

Marketplace knowledge key

"Conceptually, [the appointment of Fiedler] sounds good. I would assume that this person has knowledge of the marketplace," said Daniel Doyle, executive vice-president at Peoples National Bank of Washington in Seattle. "That really is the key."

As CEO at Hogan, Fiedler said he plans to devote his time to improving customer relations and leave managing the software business to President and Chief Operating Officer Richard Aldridge and others.

"Rick Aldridge runs our domestic sales force and the general management of the company very well. I don't expect to meddle in that," Fiedler said. "Similarly, on the technology side, I don't expect to be making day-to-day operating decisions."

Had share of fiascoes

Both Hogan and the banking software industry in general have had their share of fiascoes. Hogan had a major setback in the early 1980s, when it delivered an integrated software package to nearly 50 customers without having beta-tested it. The vendor was subsequently overwhelmed by the customer support it needed to provide.

Then the Dallas company fell on hard financial times. It dropped from a $7 million profit on revenue of $36.4 million in 1984 to a $13 million loss on revenue of $28.2 million in 1985.

By 1986, however, Hogan was rebuilding. The company signed a major deal with IBM, which now has exclusive rights to market most of Hogan's software in the U.S.

In fiscal 1986, Hogan reported a net loss of $6.8 million on revenue of $27 million. In fiscal 1987, the company reported net income of $9.5 million on revenue of $44 million.

"McTavish was the turnaround specialist, and that's what Hogan needed," E. F. Hutton's Quinn said of the former chairman. "But it appears that Hogan has made that turnaround. Fiedler has a working knowledge of banks, and that understanding is more important that product knowledge."

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EMPLOYMENT TODAY

MIS pros moving toward LANs

Companies seek managers with planning, analytical expertise

BY MICHAEL BALL
SPECIAL TO CW

At first glance, the burgeoning local-area network (LAN) field looks promising only for the most technically proficient hardware and software engineers. But someone must plan and manage those networks, and observers see this need as a good opportunity for MIS pros.

"You don't have to be an electrical engineer," says Bob LoPresto at Korn/Ferry International in Palo Alto, Calif. "You don't have to know how to design a LAN. You only have to know how to utilize all this hardware."

There is a steady and growing demand for managers, particularly at this early stage in the LAN market, according to recruiters. "In general, telecommunications offers broader career growth than traditional MIS growth paths," LoPresto says.

Complementary functions

While MIS managers may not possess a detailed understanding of communications, they can bring their knowledge of strategic planning and effective equipment usage to LAN management positions.

Jerome King with General Electric Co. in Bridgeport, Conn., says he is looking for such a crossover manager. As the company's telecommunications technology manager, he says, he needs more than just another LAN technician.

"The majority of these jobs are pretty technical," King says. "The issues are protocols and performances. But for this slot, I'm tempted to look for a good information systems person.

"We're trying to define the strategy and architecture and where we're going," he says, adding that many people with LAN expertise "are problem solvers and not planners."

An MIS manager moving into communications must know something about the technology, but the depth of knowledge is not as important as the breadth. "He needs enough technical knowledge to separate the smoke from the reality," King says. "He needs to be able to figure out the reality of a LAN vendor's offerings amid the confusion."

This task requires more analytical and planning expertise than network knowledge. At GE, perhaps only one out of 10 jobs related to LANs will be suitable for MIS professionals. However, the openings requiring an MIS person will be the more senior positions, King says.

"Many companies are willing to take a chance right now and put good MIS people ou LAN projects," says Jack Erdlin, president of Management Dimensions, Inc. in Wellesley, Mass. "The area continues to expand. Temporarily, MIS people have a good chance before the supply of experienced LAN managers and planners grows."

It will be anywhere from six months to two years before companies demand specific LAN experience, Erdlin predicts. "It's not a case of companies not wanting to grow their own," he says, "but of what is more expedient" in the meantime.

Companies are paying premiums for telecommunications staffers of all types, and an MIS person switching jobs could expect a 12% to 15% salary increase, says Roger O'Conner of Perlin Associates in New York.

Telecommunications managerial positions tend to start in the $50,000 to $70,000 range. For that amount, many companies expect candidates to possess some LAN experience, but they know they are paying for a manager, not an engineer.

Many companies that formerly hired consultants for such telecommunications-related jobs are now staffing up instead to make sure someone is permanently running the operation, O'Conner says.

A recent survey of 1,059 MIS executives conducted by Perlin Associates shows that managers with telecommunications skills received an 18% increase in base pay from last year. The greatest salary increases went to those who planned networks and software.

> THE AREA continues to expand. Temporarily, MIS people have a good chance before the supply of experienced LAN managers and planners grows."
>
> JACK ERDLIN
> MANAGEMENT DIMENSIONS, INC.

Thirty-eight percent of 32,000 DP/MIS managers and directors who responded to recent Data Processing Managers Association surveys said that they already count telecommunications as part of their responsibilities. Similarly, 35% of the respondents said they rely on a separate telecommunications manager. Of those, 60% said this manager reports to the director of information resources.

Also, 45% said their company uses at least one LAN; 57% said they use communications software for microcomputers; 95% predicted that telecommunications and networks will play a greater role in their company in the future.

Today and tomorrow

Eventually, there will be a body of MIS/LAN experts to fill the needs of many companies. In the meantime, the field offers considerable promise for interested DP professionals, according to LoPresto and others. "The field has certainly grown," he says, "and many companies are looking for telecommunications managers, even if it is just to link PCs together."

Further, LoPresto predicts that "managers cannot avoid this area and be successful in MIS. Every good MIS professional today should read as much sa possible and even take short courses in LAN [technology]."

Good MIS managers will make good candidates for LAN planning and administration and be able to see through all the product confusion, King says. "A good, technically qualified person in MIS should be able to pick up the LAN buzzwords quickly," he says, "but be better have a crackerjack assistant, who understands the technology, behind him."

Ball is a free-lance writer based in Boston.

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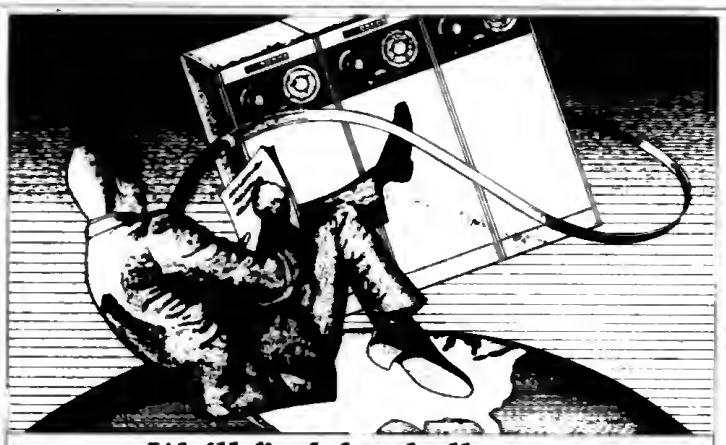

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Organization responsible for end user analysis has an opening for an individual to participate in data analysis, functional analysis and logical model definition. Qualified candidates should have a minimum of 1 year's experience in data analysis and 2 years of strong structured systems analysis, financial business analysis or data administration experience. This position involves heavy interface with the user and applications development communities, strong communication and organization skills are required, with project management experience a plus.

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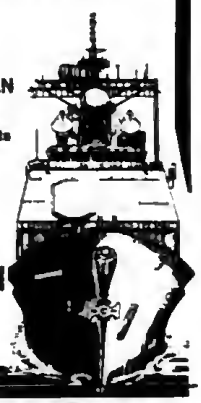

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Opportunities are now available for experienced VAX Systems Support Specialists. Successful candidates should possess a BS or MS in computer science or related field and possess two or more years experience with VAX systems management, VAXCLUSTERS, networking and system programming.

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Qualified candidates are invited to write: Bob Webber, Senior Staffing Representative, E-Systems, Inc., Garland Division, Department 41, Post Office Box 660023, Dallas, Texas 75266-0023.

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NCR PROGRAMMERS

San Antonio's largest financial institution with assets over $2.3 billion, is currently experiencing tremendous growth and expansion in its Data Center.

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- SASA offers an excellent benefit package and salary commensurate with experience.

Please send resume with salary requirements in confidence to:

D. Zimmerer
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P.O. Box 1610
San Antonio, TX 78296
EOE M/F

TEST ENGINEER. Provide technical support to production in area of data communication and system level; validate and introduce new data communication systems into production; develop diagnostic procedures; assist in preparing documentation to support products; specify test equipment for new product evaluation and production testing. Minimum of MS or equivalent CS. Applicants must have background in programming systems and development and systems development and design; knowledge of data communications and computer networks (ISO OSI reference model, SNA, X.25, TCP/IP, IEEE 802 standard (related and hierarchal, distributed) knowledge of "UNIX®, VAX 11/780, HP 3000, IBM PC. Maintain C, Pascal, Assembly, Fortran and LISP. $2,880/month. Job site/interviews: Mt. View, CA. Applicants please clip ad and send to Pyramid Technology, 1295 Charleston Rd., Mt. View, CA 94039-7295. Attention: Human Resources Department. MC/CW. "UNIX® is a registered trademark of AT&T.

PROGRAMMER FINANCIAL/SYS ANALYST
--$35,000--

PROGRAMMING BKGROUND REQUIRED for this stimulating financial analyst spot. COBOL, CICS & VSAM as well as some database exp essential. Act as USER INTERFACE in designing all new financial systems. Trouble shoot & maint programming involved as well. Banking apply.

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SYSTEMS PROFESSIONALS

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Opportunities at our Minneapolis based headquarters currently exist for the following positions:

SUPPORT PROGRAMMER ANALYST

Our support group handles maintenance, enhancements and small new development on systems in all areas of the business. The position involves significant user contact and requires proven COBOL expertise in an IMS DB or related database environment.

DATA ADMINISTRATION ANALYST

Responsibilities of this position include logical design and review, as well as data dictionary support. Candidates should be degreed with at least one year of data administration experience and a background in entity relationship modeling.

DATABASE ADMINISTRATOR

Position involves data administration for all IMS and DB2 databases. Candidates should be degreed with 3+ years of IMS database administration experience, including database recovery, database tuning and physical database design. DB2 experience a plus.

Dayton Hudson Department Store Company operates a large, multiple IBM mainframe environment, and has a strong commitment to MIS. We offer a competitive salary, excellent benefits including relocation and a work environment conducive to your personal growth and development.

Qualified applicants should send a resume, including salary history, to: **Michael Tracy, Executive Placement/B62, Dayton Hudson Department Store Company, 700 Nicollet Mall, Minneapolis, MN 55402.** An Equal Opportunity Employer. Please no agencies.

DAYTON HUDSON
DEPARTMENT STORE
COMPANY

SYSTEMS ANALYST

Analyzes business procedures & problems to refine data & convert it to programmable form for electronic data processing. Studies existing data handling systems & develops new systems to improve production or workflow as req'd. Specifies in detail logical and/or mathematical operations. Must be familiar w/real time operating system & programming languages. M.S. degree in Computer Science or Engineering, 1 yr. exp. in Industrial Engineer or subject job. $2,629/mo. Job site/interview in N. Hollywood, CA. Send this ad & a resume to Job #9K 8767, P.O. Box 9560, Sacramento, CA 95823-0560 not later than 09-09-87.

Analyst/Programmer to handle on-line programming and systems analysis in customer information control operating systems (CICS) using COBOL. Designs, tests and codes software programs for Transaction packge. Handles data base creation using IMS and system interface. Provides technical assistance. Evaluates, debugs and modifies aspects of operating system and software packages. Prepares reports of all modifications. Must have min. B.S degree in Computer Science or related field plus 2 yrs exp some job or 5 yrs exp same or related. If no degree, technical writing ability; excellent problem solving/analytical skills using models and flow charts; excellent oral and written communication skills; knowledge of data base management systems interface techniques. Hrs: Mon-Fri, 8am-5pm. Salary: $2,353/mo. Send resume only to Job Service of Florida, 701 SW 27th Avenue, Room 1A, Miami, FL 33135. REF: Job Order # FL4539795.

Consultant Programmer-Info Center. Work with end users to define/solve bus. pblms. Use COBOL, FOCUS & PC software. Perform above in support of large end user community, COBOL, PC, BA/BS, Comp Sci. Mail Resume NYS Job Service, Order #8000855, DOT #012.-167.066, 97-45 Queens Blvd., Rego Park, NY 11374.

PROGRAMMER/ANALYST. Analyze, design, code, maintain, document & debug syst programs for various companies & financial inst's. Wilhandel instit's, seek on Trust Cash Syst & Trust Cash Mgmt Syst. Wfcommercial instit's, develop a major Payroll/Benefits data processing syst. Conduct user training on syst during final implementation & turnover. 2 yrs exp req'd. Bachelor's in Computer Sci, Statistics or Math. Must know the following hardware & software: IBM 3084, TOS/IBM COBOL, VSAM, OS JCL & Utilities, CULPRIT, SCRIPT, DATA-EXPERT. $30,000/yr, 40 hrs/wk. Pinkerton Computer Consultants, Inc. 20 Broad St. Suite 1302. NYC 10005. Send resumes. Att: AJ#920

Computer Systems Analyst wanted to design, develop and implement computer software for business and financial applications using Fourth Generation Languages and XGEN languages, and DMS II and GEMCOS software for use on large UNISYS/A12 and UNISYS/B20 BTOS version information processors; Requires B.S. degree in Computer Science and Bachelor's degree level courses, one each in: Artificial Languages, Automata Theory, Systems Programming, and Non-Arithmetic Programming; $27,000 per year; 40 hours per week. Send resume to 7310 Woodward Ave., Room 415, Detroit, MI 48202. Ref. #47987. "Employer Paid Ad"

Programmer/Analyst - Analyze, design, develop, implement and test management information applications. Write program specifications, interface hardware and software. Use CICS, DL/1, DOS/VSE, COBOL on IBM mainframes. 2 years experience. 40 hours per week. $36,500 per year. Job location New York Metropolitan area. Applicants must have US employment authorization. Send resume in duplicate to: BD#5, Room 501, One Main Street, Brooklyn, NY 11201.

Prog/Anl III in Registrar's Office. Analyze current functions, pgms, & rpt requests. Prepare flowcharts & pgm spec. Code & modify existing pgms. Propose enhancements or new dev & identify impacts on user req'ts, organization, policies & procedures, resources, & syst interfaces. Write technical & user docs. Requirements: B.S. in Computer Science, plus a minimum of 2 yrs of exp as programs of systems or M.S. in Computer Science in lieu of exp. Working exp in writing programs in COBOL, PL/I, FOCUS, & IBM Assembler. Working exp & in depth knowledge of IBM/MVS/MM file structures & applications. Working exp & in depth knowledge of IBM JCL/PROC & TSO commands in OS/MVS environment. Demonstrated ability in req't analysis, design & dev of syste to perform user & syst support tasks. Job Location: Los Angeles. $3,085/mo. Send this ad and resume to JOB #MLUA083, P.O. Box 9560, Sacramento, CA 95823-0560, no later than 9/14/87.

PROGRAMMERS/ANALYSTS
SYSTEMS ANALYSTS
DBAs

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Please forward your resume with salary history to: Chuck Pacheco, MS P280, Personnel Services Division 70290-AD, Los Alamos National Laboratory, Los Alamos NM 87545.

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LOS ALAMOS

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Full-time, tenure track position in Computer Science. Masters degree in Computer Science or Computer Information Science required. Doctorate desirable. Responsibilities include teaching a variety of undergraduate Computer and Information Science courses, curricular development, student advisement, and committee assignments. Knowledge of business application and/or AI/Expert Systems essential. Teaching experience at an institution of higher learning desirable. Computer experience in commerce or industry preferred. Competitive salary with excellent fringe benefits. Position available January 2, 1988; application deadline October 15, 1987. Send letter of intent, resume, transcripts, and three current letters of recommendation to:

Mr. Clarence L. Kreutz, Chairman
Computer Science Search Committee
Mansfield University - Arts Bldg.
Mansfield, PA 16933

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* System Programmers
* Analysts Programmers

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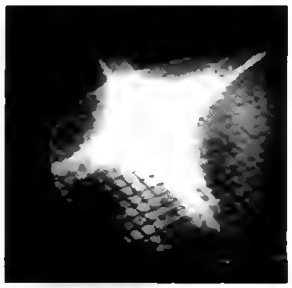

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- Requirements analysis, implementation, and use of scientific databases using Battelle's DM relational database management system.
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Requirements: M.S. in Computer or Information Science, training in a physical science, and 1-3 yrs. experience using a DBMS on VAX systems.

Battelle offers competitive salaries and comprehensive employee benefits.

Please direct your resumes to Ms. Joan Sundstrom, Battelle Ocean Sciences, 397 Washington Street, Duxbury, MA 02332.

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SYSTEMS PROGRAMMER

MIAMI-DADE COMMUNITY COLLEGE - South Campus. Operating System responsibility for 3081-class computer. Requires Bachelor's degree in field and 5 yrs. data processing experience, in-depth design knowledge, programming and maintenance of computer software and experience in training of computer programmers and operators. 2 yrs. exp. as a Systems Software Programmer. Thorough familiarity with IBM operating systems (SVS, MVS/XA). Additional knowledge of community-used systems software (JES2, RACF, Omegamon, etc.) desirable. Salary: $32,875 Min. Liberal Benefits.

Submit two (2) copies of resume, academic credentials and three (3) letters of reference to: Personnel Services, 11011 S.W. 104 St. Miami, FL 33176. MUST be received by September 18, 1987.

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Systems Analyst - Design and develop the specifications and lead the implementation of information management and training management systems. Modify programs to meet client special requirements. Debug, troubleshoot and provide client support and programmer training. Knowledge of or training with Data Base and File Management systems and information processing. Familiarity with microcomputer architecture software and systems. Knowledge of image processing technology and computer graphics. M.S. or B.S. and two years experience in Computer Science. Salary $2,730 per month. Job site: Walnut Creek, CA. Please send this ad and a resume to Job #NOF 747, P.O. Box 9560, Sacramento, CA 95823-0560 no later than September 15, 1987.

We are looking for a Senior Programmer Analyst. The successful candidate will have a doctorate in Computer Science or Information Services and possess strong programming skills. In addition, experience with the Burroughs "A" Series is important, financial services experience is a plus. Salary is in the mid 30's.

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QUALIFICATIONS: Bachelor's degree in Computer Science, Business Statistics or related area is necessary. Six to eight years experience, four of which must have been in data processing and include experience in programming, design, or analysis is necessary. (Graduate education and experience may be interchanged on a case by case basis.) Must have good, hands-on skills and total almost of latest technological developments with P.C., microcomputer and mainframe. Also, public management experience is highly desirable. Must have good communication skills and ability to articulate highly complex issues and detailed information to all levels of understanding. Salary range: Negotiable based on skills and experience.

Contact: J.W. Stevenson, Director, Procurement/Materials Management, 101 General Services Building, Columbia, Missouri 65211. Telephone: (314) 882-8084

STAFF SYSTEMS ANALYST/SOFTWARE SYSTEMS: Responsible for providing computerized systems, artificial intelligence support to enhance the effective control & reporting of trading activities. Participates in all phases of a systems project life cycle. Codes programs in structured form, tests programs which have been coded by using sample data & prep of documentation to turn those programs over to the production. Participates in overall systems training as req'd. Participate in dept. processes such as trainee recruitment & interest systems testing. Will interface with center operations to correct testing & production results. Installing systems to those within & other areas that FORTRAN, APL, PL/I, COBOL. Tests analysis of systems to improve efficiency which involves use of computer time. Training users in Tokyo, London & NY in the use of int'l trading systems. Using knowledge of the securities industry/brokerage operations to design & develop new systems & systems. Design & develop algorithms to interpret & forecast trading info from existing prices & economic data. Req's Bachelors in Comp Sci +0 months training in securities industry in req MIS environment. Banking environment & 6 months on job or full-time of 6 months exp in analytical support. 40 hrs/wk; 9-5; call 635-5900 or, New York City; must have US employment authorization. Send resume in confidence to: Adolfo, Rm 501, 1 Main St, Bklyn, NY 11201.

SYSTEMS ANALYST: Functions & programming design, coding, implementation & testing of applications for Secondary Mktg Programs of Mortgage Line Distributed Processing System for major life developed lab. Utilizes PROMPT utility tool to provide data collection/validation processes through predefined "data dictionary" providing screen design w/various function controls to input data. Req's data & database conversions & collection/validation editing processes. Utilizes INFORMIX (DB Prog & COBOL compiler + utilities on AT&T 3B2) & super informix. 1 yr exp or 1 yr rel programming exp. Bach - Comp Sci &/or Math. Must know DBMS, DB design, data organization, semantic data models, communications & networking concepts, computer theory concepts, COBOL under UNIX op syst, ISAM, FOCUS, INFORMIX or dBASE III and microprocessors & microcomputers. $28,000/yr, 40 hrs/wk. 3D Information Services, Inc. 465 Union Ave., Bridgewater, NJ 08807. Send resume.

Senior Programmer Analyst. To research, design and implement the following: Rmg and security system for computer buildings using Expert Database system; artificial intelligence techniques for building reading, verifying, or common system and lighting control utilizing OPS-83 artificial intelligence language, logic programming, PROLOG and conflict resolution strategy. Requires Master of Science in Computer Science including 5 years of college education. Other requirements include two major projects in either past employment or in post graduate work in the following areas: PASCAL, PROLOG, and OPS-83 programming language, computer network and algorithms. This requirement shall be concurrent with 3 years experience as a computer based software engineer/programmer. Hours: 8:00am - 4:30pm, 40 hours per week at $37,200 per year salary

Please send resumes to: Illinois Department of Employment Security, 401 South State Street-7 South, Chicago, IL 60605, Attn: Robert S. Fallon, Reference #V-IL 6724 F. AN EMPLOYER PAID AD

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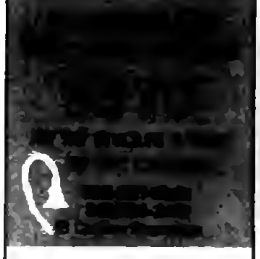

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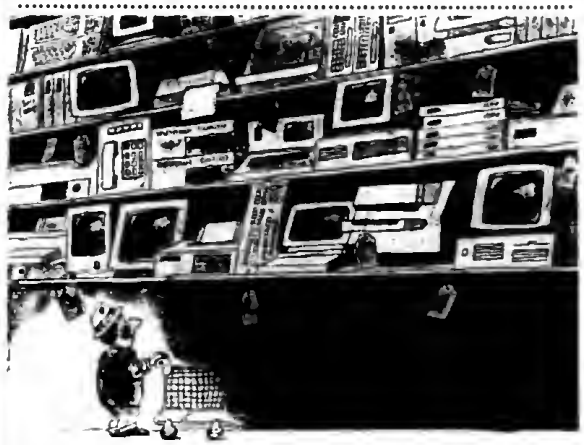

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Sept. 28	Hardware Roundup: Small Scale Systems	Sept. 11
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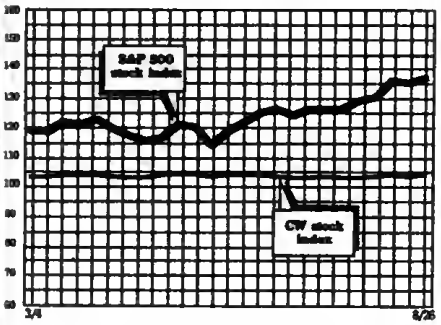

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Leasing Companies	118.8	121.1
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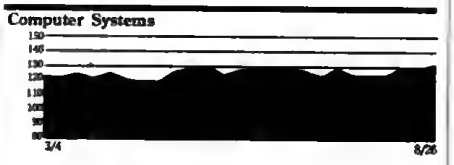
Communications

Computer Systems



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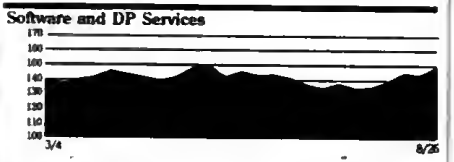

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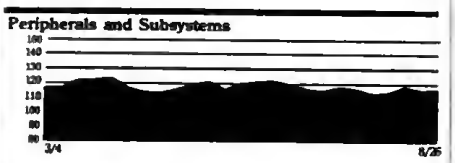
Peripherals and Subsystems



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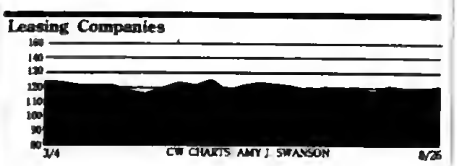

CW CHARTS: AMY J. SWANSON

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, AUG. 26, 1987

E x c h		52 WEEK RANGE (1)		PRICE CLOSE AUG. 26 1987	WEEK NET CHNGE	WEEK PCT CHNGE
	Communications and Network Services					
N	AMERICAN INFO TECHS CORP	101	77	97.63	+3.1	+3.3
Q	ANDREW CORP	19	14	17.00	+0.0	+0.0
Q	ARTEL COMM CORP	5	2	2.63	-0.3	-8.7
N	AT&T	38	22	34.38	+0.1	+0.4
Q	AVANT GARDE COMP INC	7	3	5.25	+1.0	+23.5
Q	AVANTEK INC	18	13	14.63	+0.0	+0.0
N	AYDIN CORP	38	18	34.13	+2.3	+7.1
N	BELL ATLANTIC CORP	77	62	76.75	+1.8	+2.5
N	BELLSOUTH CORP	46	25	42.63	+0.0	+0.0
Q	BRIDGE COMMUNICATION	27	11	23.25	+0.5	+2.2
Q	COMPRESSION LABS INC	12	4	5.50	+1.0	+22.2
O	COMPUTER NETWORK TECH	8	3	3.63	-0.1	-1.7
Q	CONTEL CORP	40	27	37.88	+0.4	+1.0
Q	DATA SWITCH CORP	8	5	7.50	+1.3	+20.0
Q	DIGITAL COMM ASSOC	48	18	38.50	+1.4	+3.7
Q	DYNATECH CORP	44	27	32.00	+1.0	+3.2
Q	EQUATORIAL COMM CO	8	2	3.13	-0.1	-3.8
Q	GANDALF TECHNOLOGIES	11	5	7.38	+0.1	+1.7
Q	GENERAL DATACOMM INDS	14	8	9.00	+0.0	+0.0
N	GTE CORP	45	34	42.50	-0.3	-0.6
Q	INFOTRON SYS CORP	12	7	9.25	+0.0	+0.0
N	ITT CORP	66	47	63.88	+0.5	+0.8
N	M/A COM INC	18	12	15.00	-0.1	-0.8
Q	MCI COMMUNICATIONS CORP	10	5	9.50	+0.4	+4.1
N	MICOM SYS INC	16	10	12.00	+0.0	+0.0
Q	NETWORK SYS CORP	18	8	11.50	+0.1	+1.1
N	NORTHERN TELECOM LTD	24	14	22.50	-0.4	-1.7
Q	NOVELL INC	27	10	23.25	+1.0	+4.5
N	NYNEX CORP	77	59	75.75	+1.5	+2.0
N	PACIFIC TELESIS GROUP	32	23	31.00	+0.5	+1.8
Q	PARADYNE CORP	8	4	6.25	+0.1	+1.6
A	PENRIL CORP	6	4	4.63	+0.3	+5.7
N	PLESSEY PLC	41	24	30.50	+1.0	+3.4
N	SCIENTIFIC ATLANTA INC	20	8	18.50	-0.8	-3.8
N	SOUTHWESTERN BELL CORP	42	33	41.63	+0.8	+1.8
Q	3 COM CORP	24	9	17.25	+0.4	+2.2
N	TIMEPLEX INC	41	15	30.25	-1.5	-4.7
N	UNGERMANN BASS INC	18	7	8.75	-0.4	-3.7
N	U S WEST INC	82	45	58.50	+2.0	+3.5
	Computer Systems					
Q	ALLIANT COMPUTER SYS	37	15	18.00	+1.8	+10.8
Q	ALPHA MICROSYSTEMS	7	3	4.88	-0.1	-2.5
Q	ALTOS COMPUTER SYS	17	10	13.38	-0.1	-0.8
A	AMDAHL CORP	44	18	42.25	+1.8	+3.7
Q	APOLLO COMPUTER INC	25	11	21.00	-0.1	-0.8
Q	APPLE COMPUTER INC	54	16	52.00	+2.0	+4.0
Q	BOLT BERANEK & NEWMAN	30	10	22.38	+1.3	+5.9
Q	BRITTON LEE INC	5	3	3.25	+0.0	+0.0
N	COMPAQ COMPUTER CORP	59	14	56.13	+1.9	+3.5
Q	COMPUTER AUTOMATION INC	17	2	12.75	-0.3	-1.9
A	COMPUTER CONSOLES INC	12	7	7.00	-0.5	-6.7
Q	CONCURRENT COMP CORP	22	13	21.25	+2.0	+10.4
N	CONTROL DATA CORP DEL	35	24	33.38	-1.4	-4.0
Q	CONVERGENT TECH	12	4	8.13	+0.4	+4.8
Q	CONVEX COMPUTER CORP	22	8	14.88	-0.1	-0.8
N	CRAY RESH INC	138	86	117.50	+7.0	+5.3
Q	DAISY SYS CORP	13	7	7.25	-0.4	-4.8
N	DATA GEN CORP	39	25	34.00	+0.8	+2.3
N	DATAPOINT CORP	9	4	8.25	+0.5	+6.5
N	DIGITAL EQUIP CORP	189	89	190.00	+10.5	+5.8
N	FLOATING POINT SYS INC	17	8	10.38	-0.1	-1.2
N	GOULD INC	25	16	23.88	+1.0	+4.4
N	HARRIS CORP	43	27	38.75	+1.3	+3.3
N	HEWLETT PACKARD CO	69	37	67.13	+2.1	+3.2
N	HONEYWELL INC	81	56	67.00	+0.1	+0.1
N	IBM	176	116	167.88	-4.8	-2.8
Q	INFORMATION INTL INC	17	13	13.50	-0.4	-2.7
Q	IPL SYS INC	3	2	2.75	+0.0	+0.0
Q	MASS COMPUTER CORP	12	5	11.50	+2.0	+21.1
B	MATSUSHITA ELEC INDL LTD	176	93	170.00	+1.0	+0.6
Q	MEGADATA CORP	7	2	5.25	+0.5	+10.5
Q	MENTOR GRAPHICS CORP	25	13	25.00	+4.1	+13.4
N	NBI INC	14	8	12.13	+0.3	+2.1
N	NCR CORP	87	42	85.25	+2.9	+3.5
N	PRIME COMPUTER INC	31	16	29.38	+1.8	+6.3
Q	PYRAMID TECHNOLOGY	12	4	8.00	+0.3	+3.2
Q	STRATUS COMPUTER	41	18	29.75	-0.3	-0.8
Q	SUN MICROSYSTEM INC	48	13	34.63	1.0	2.8
Q	SYMBOLICS INC	7	4	4.00	-0.1	-3.0
N	TANDEM COMPUTERS INC	38	18	32.63	+2.4	+7.9
N	TANDY CORP	56	31	48.75	+0.0	+0.0
N	ULTIMATE CORP	33	13	32.13	+0.8	+2.0
N	UNISYS CORP	48	22	44.75	+0.0	+0.0
A	WANG LABS INC	19	11	17.75	+0.0	+0.0
	Software & DP Services					
Q	ADVANCED COMP TECH	5	3	3.63	+0.0	+0.0
N	ADVANCED SYS INC	28	12	27.38	+1.4	+5.3
N	AGS COMPUTERS INC	22	8	19.38	+0.1	+0.6
Q	AMERICAN MGMT SYS INC	18	7	17.38	+0.1	+0.7
Q	AMERICAN SOFTWARE INC	22	8	17.50	+0.3	+1.4
Q	ANACOMP INC	11	3	9.75	-0.1	1.3
Q	ANALYSTS INTL CORP	8	3	8.25	-0.1	-1.5
Q	ASHTON TATE	30	12	23.38	-0.6	2.8
Q	ASK COMPUTER SYS INC	17	10	14.75	+0.5	+3.5
Q	AUTODESK INC	34	10	28.50	+1.0	+3.6
N	AUTO DATA PROCESSING	55	30	52.75	+0.0	+0.0
Q	BOOLE & BABBAGE INC	12	4	10.50	+0.0	+0.0
N	COMPUTER ASSOC INTL INC	32	10	31.25	+2.4	+8.2
N	COMPUTER HORIZONS CORP	15	10	12.38	-0.1	1.0
N	COMPUTER SCIENCES CORP	66	30	64.38	+5.6	+9.8
N	COMPUTER TASK GROUP INC	18	11	13.25	+0.1	+1.0
Q	COMSHARE INC	28	11	25.25	+0.0	+0.0
Q	CULLINET SOFTWARE INC	13	6	12.88	+0.0	+0.0
Q	CYCARE SYS INC	12	7	9.75	+0.5	+5.4
Q	DUQUESNE SYS INC	33	12	17.50	+0.3	+1.4
Q	ENDATA INC	15	5	14.00	+4.0	+40.0
N	GENERAL NITRS (CLS E)	48	24	48.13	+0.8	+1.6
Q	HOGAN SYS INC	17	8	11.13	1.3	10.1
Q	INFORMIX CORP	23	7	21.75	+2.0	+10.1
Q	INTELLICORP INC	11	4	7.75	+0.8	+10.7
Q	KEANE INC	10	5	7.00	-0.1	-1.8
Q	LOTUS DEV CORP	37	11	33.50	+0.0	+0.0
Q	MANAGEMENT SCI AMER	21	11	12.63	+0.3	+2.0
Q	MICRO PRO INTL CORP	8	2	5.81	+0.2	+3.3
N	MICROSOFT CORP	128	26	115.50	+13.0	+12.7
Q	NATIONAL DATA CORP	34	17	33.13	+1.3	+3.8
Q	ON LINE SOFTWARE INTL INC	22	8	19.63	0.3	1.3
Q	ORACLE SYS CORP	30	7	24.75	+0.5	+2.1
N	PANSOPHIC SYS INC	23	12	21.75	+3.0	+16.0
Q	POLICY MGMT SYS CORP	30	15	24.75	+1.5	+6.5
Q	PROGRAMMING & SYS INC	13	8	12.63	+0.0	+0.0
Q	REYNOLDS & REYNOLDS CO	38	27	37.00	+0.8	+2.1
Q	SEI CORP	18	8	16.75	+0.3	+1.5
Q	SHARED MED SYS CORP	53	23	28.63	+3.0	+11.7
Q	SOFTWARE AG SYSTEMS INC	30	10	13.25	+0.6	+5.0
Q	SOFTWARE PUBG CORP	17	5	10.13	+0.0	+0.0
A	STERLING SOFTWARE INC	18	8	9.63	-0.1	1.3
Q	SUNGARD DATA SYS INC	21	10	19.00	+0.8	+4.1
O	SYSTEMATICS INC	30	14	26.50	+0.5	+1.8
N	UCCEL CORP	52	20	48.75	+0.0	+0.0
N	URS CORP	30	12	19.88	-0.8	+4.6
Q	VM SOFTWARE INC	45	15	16.50	1.0	5.1
	Semiconductors					
N	ADV MICRO DEVICES INC	25	13	22.50	+2.1	+10.4
N	ANALOG DEVICES INC	24	14	21.63	+0.8	+4.2
Q	ANALOGIC CORP	13	10	12.50	+0.3	+2.0
Q	INTEL CORP	55	18	55.00	+4.8	+9.5
Q	LSI LOGIC CORP	17	8	12.75	+1.8	+14.8
Q	MONOLITHIC MEMORIES INC	18	10	10	+0.0	+0.0
N	MOTOROLA INC	72	34	71.38	+8.5	+13.5
N	NATL SEMICONDUCTOR	17	8	15.63	+1.3	+8.7
N	TEXAS INSTRS INC	78	35	76.63	+7.8	+11.1
R	WESTERN DIGITAL CORP	33	13	28.00	+0.6	+2.3
	Peripherals					
N	AM INTL INC	8	5	7.75	-0.5	-6.1
Q	AST RESH INC	22	11	16.38	-0.5	-3.0
Q	AUTO TROL TECH CORP	8	3	6.00	+0.0	+0.0
Q	BARCTEC INC	18	8	12.63	+0.4	+3.1
Q	CIPHER DATA PRODS INC	18	8	10.13	-0.3	-2.4
A	COGNITRONICS CORP	5	2	4.25	-0.1	-2.8
N	COMPUGRAPHIC CORP	26	16	25.00	+0.3	+1.0
N	COMPUTERVISION CORP	23	12	14.25	-0.5	-3.4
Q	CONNAC CORP	30	12	0.00	+0.0	+0.0
A	DATAPRODUCTS CORP	16	10	11.63	+0.0	+0.0
R	DATARAM CORP	8	7	7.50	+0.1	+1.7
N	DECISION INDS CORP	13	7	11.75	+0.9	+8.0
N	EASTMAN KODAK CO	104	52	102.00	+1.8	+1.8
Q	E M C CORP MASS	40	11	39.75	+3.8	+10.4
Q	EMULEX CORP	10	6	7.63	+0.1	+1.7
Q	EVANS & SUTHERLAND	40	30	33.25	+0.0	+0.0
Q	ICOT CORP	13	5	6.50	+0.3	+4.0
Q	INTERLEAF INC	20	8	16.13	-0.8	3.7
Q	IOMEGA CORP	11	2	2.88	+0.1	+4.5
Q	LEE DATA CORP	10	5	5.25	+0.4	+7.7
Q	MASSTOR SYS CORP	8	3	4.88	+0.0	+0.0
Q	MAXTOR CORP	24	12	13.63	-0.4	2.7
Q	MICROPOLIS CORP	44	14	33.63	-0.1	-0.4
Q	MINISCRIBE CORP	15	5	14.00	+0.3	+1.8
N	MINNESOTA MNG & MFG CO	84	50	82.50	+3.1	+3.8
A	MSI DATA CORP	23	10	22.00	+3.8	+20.5
Q	PRIAM CORP	8	2	3.50	-0.1	-3.4
Q	PRINTRONIX INC	14	10	11.00	-0.3	-2.2
Q	QMS INC	25	11	23.50	+1.5	+6.8
Q	QUANTUM CORP	25	15	17.50	+0.3	+1.4
Q	RAMTEK CORP	8	4	5.88	+0.3	+4.4
N	RECOGNITION EQUIP INC	27	12	17.00	2.4	12.3
Q	REXON INC	14	5	9.13	0.9	8.8
Q	SCAN TRON CORP	17	11	13.00	+0.5	+4.0
Q	SEAGATE TECHNOLOGY	46	13	28.38	1.6	5.8
N	STORAGE TECH CORP	5	2	3.00	-0.1	-2.2
Q	TANDON CORP	7	2	4.00	-0.1	-3.0
A	TEC INC	7	3	4.63	+0.1	+2.8
N	TEKTRONIX INC	43	30	39.50	-0.4	-0.8
Q	TELEVIDEO SYS INC	3	2	2.63	-0.3	-10.7
N	TELEX CORP	102	56	71.50	+8.0	+12.5
Q	WYSE TECH	38	13	33.13	+1	+3.5
N	XEROX CORP	85	51	81.75	+1.8	+2.2
Q	XIDEX CORP	19	11	12.38	-0.3	2.0
	Leasing Companies					
N	COMDISCO INC	25	15	34.13	+3.5	+11.4
N	CONTINENTAL INFO SYS	14	7	11.25	+0.1	+1.1
Q	PHOENIX AMERN INC	6	3	4.50	+0.1	+2.9
Q	SELECTERM INC	7	5	5.00	-0.3	-4.8
N	U S LEASING INTL	55	40	52.63	-0.8	1.2

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(1) TO NEAREST DOLLAR

Wild ride

IBM peaks, then falls sharply; market down after giddy high

A wild market week in which IBM's recent stock surge collapsed demonstrated the extreme sensitivity of the current bull market to the slightest hint of bad news.

After paralleling the rise of the Dow Jones industrial average and hitting a new high of 175¼ during trading on Friday, Aug. 21, IBM sparked an overall market decline by falling fast last week. In generally heavy trading, Big Blue tumbled 2⅝ points Tuesday, 4⅛ points Wednesday and another 1⅛ Thursday, closing at 166¼.

Although reduced 1987 earnings estimates by influential IBM analysts at Kidder Peabody & Co. and Salomon Brothers, Inc. catalyzed the selloff, market observers suggested that IBM's stock was the scapegoat for jittery investors waiting for a bailout signal. After the Dow crested over 2720 on Tuesday, the bubble burst, and many analysts felt the long-awaited market "correction" was underway. An advertisement for a leading brokerage firm last week posed the question, "Has the market moved too far too fast?" Investors last week answered a resounding "yes," and IBM's stock bore the brunt of their resulting actions.

CLINTON WILDER

DEC, C. Itoh end patent clash

Japanese firm submits; halts some terminal sales, changes screen format

BY CLINTON WILDER
CW STAFF

MAYNARD, Mass. — Digital Equipment Corp. announced last week a settlement of a VT220 terminal patent and copyright infringement lawsuit that it said sends a signal to makers of DEC-compatible products.

DEC settled its 4-year-old litigation with Japan-based C. Itoh & Co., which agreed to stop selling, on a worldwide basis, its CIT-220+ terminals and to change the setup screen formats on its CIT-224 terminals.

Both monitors are sold in the U.S. through C. Itoh's Irvine, Calif.-based subsidiary, CIE Terminals, Inc.

CIE Terminals has sold only nominal numbers of the CIT-220+ since introducing the CIT-224 two years ago. But DEC spokesman Jef Gibson said the settlement is more significant from the larger perspective of DEC's relationship with the third-party DEC-compatible market.

Recognized rights

"The significance is C. Itoh's recognition of our intellectual property rights," Gibson said. "It sends a signal to the world that we intend to protect those."

According to a C. Itoh spokesman, changing the CIT-224 screens involves firmware changes that will not be expensive or time-consuming for the vendor.

DEC originally filed its patent infringement suit in December 1984, 15 months after C. Itoh introduced the CIT-220+. C. Itoh noted that its product was introduced before the DEC patent was issued. The patent covers the wedge-shaped design of the terminal.

Neither company would comment on whether financial terms were involved in the settlement.

According to Dataquest, Inc., a San Jose, Calif.-based research firm, CIE Terminals is the second largest vendor of VT220-compatible terminals in the U.S., with 8.9% of the market.

Wyse Technology holds a 13.6% market share, and DEC accounts for 49.8% of the market.

Ramis/PC eyes PC/Focus

NEW YORK — To counter competition from Information Builders, Inc.'s PC/Focus, On-Line Software International, Inc. is set this week to enhance its Ramis/PC Workstation program with improved data base capabilities and support of Lotus Development Corp. 1-2-3 Release 2 work sheets.

The $495 stand-alone fourth-generation language information management system, to be announced tomorrow at PC Expo in New York, is aimed at both personal computer end users and expert applications developers, the firm said.

Like the PC/Focus package, Ramis/PC was developed to allow fourth-generation language applications development, which often occurs on mainframes and minicomputers, to take place on less expensive microcomputers.

Applications can also run on microcomputers and can reportedly simply pull data from the fourth-generation language running on host computers.

Enhancements to the Ramis/PC relational data base include complete relational file manipulation, multiple field linkage and an expanded screen editing capability. These additions are meant to bring Ramis/PC closer to the level of the company's Ramis Information Management, which runs on mainframe computers.

The updated package can also convert data to a variety of PC file formats, including 1-2-3 WKS and WK1 files and the Ashton-Tate Dbase III file format.

Ramis/PC now includes a menu-based transaction processing feature based on the Data Maintenance Facility found in the mainframe version, according to the company.

This feature can use files from 1-2-3, Dbase and other personal computer packages while maintaining the original file structure and programming syntax, the firm claimed.

Banyan secures Vines

BY PATRICIA KEEFE
CW STAFF

WESTBORO, Mass. — Banyan Systems, Inc. this week will demonstrate Vanguard, an extension of its virtual network software (Vines) operating system said to bring mainframe-like security to local-area networks (LAN).

Vanguard is positioned as a fully integrated service of Vines Release 3.0, which is slated to be released in November, according to the company.

VANGUARD offers features similar to those found in mainframe security packages like IBM's RACF, Uccel Corp.'s ACF2 and Computer Associates International, Inc.'s CA-Top Secret.

Support for IBM's LU6.2 is a key feature of Vines Release 3.0, the company said.

Similarities

Vanguard, to be announced at PC Expo this week, offers features similar to those found in mainframe security packages like IBM's RACF and Uccel Corp.'s ACF2 as well as Computer Associates International, Inc.'s CA-Top Secret, Banyan claimed.

Features include audit trails and reporting tools, password encryption, protection from unauthorized logon or access to network traffic and other capabilities that significantly increase an administrator's ability to control access to networks running Vines, according to the company.

A wide range of group and individual security features will be offered, the vendor said, including user identification expiration dates, limitations on users' ability to change passwords and physical location as well as time/date logon restrictions and dial-in limitations.

Security highlights

Banyan is highlighting the following two major security benefits:

- The ability for LAN administrators to select the level of protection and combination of security options they want for their organizations.
- The ability to centrally control access to network resources.

Similar capabilities have been announced for Release 2.1 of Novell, Inc.'s Netware, which has a fourth-quarter delivery date.

Because Vanguard is fully integrated in Banyan's Street Talk networkwide naming service, implementing Vanguard features will be a familiar step for Vines administrators, Banyan said.

Upgrades available

Vanguard will be included with the base price of Vines Release 3.0, which is priced at $1,895, the company said.

Current Vines users who have purchased Banyan's support contract will be able to upgrade to Vanguard free of charge, according to a spokeswoman.

Customers who do not purchase support will pay a fee not yet determined, according to the company.

CXI card ties PS/2s, nets to IBM hosts

MOUNTAIN VIEW, Calif. — CXI, Inc., the data communications division of Novell, Inc., introduced a micro-to-mainframe communications board last week for Models 50 and above of IBM's Personal System/2 family.

The Pcox/Coax-P coaxial board reportedly works with the PS/2 Micro Channel bus. In addition, it is said to provide connectivity to IBM or IBM-compatible mainframes for individual PS/2 computers as well as for PS/2s on Novell's Netware-based local-area networks (LAN). Netware is a network operating system.

The new board can function as a gateway to a Netware-based LAN. When the board is installed in one PS/2 on the network along with Pcox/GW-3270 gateway software, each personal computer on the network that has Pcox LAN workstation software can gain access to mainframe resources through the gateway, CXI said.

The Pcox/Coax-P also features compatibility with existing coaxial versions of CXI's Pcox software. Pcox/Coax-P provides PS/2 users with a connection to an IBM cluster controller over coaxial cable and can provide the following features: single and multiple host sessions, support for windowing and file transfer and emulation of expensive mainframe printers by PC printers.

Scheduled for availability in October for $545, Pcox/Coax-P will be demonstrated at PC Expo in New York this week.

The Ultimate Pick: Deal clears way for Tandem

BY ROSEMARY HAMILTON
CW STAFF

IRVINE, Calif. — The lawsuit between Pick Systems and a small Houston-based company over a Pick look-alike operating system called Epic was resolved recently when The Ultimate Corp. acquired Epic and agreed to pay royalties to Pick Systems for it.

Pick Systems announced its $100,000 settlement last week from Ever-On Corp., maker of the Epic operating system.

Ever-On officials were not available for comment.

According to an Ultimate official, the operating system was acquired this month and will be officially announced under a new name in the middle of next month.

The introduction will coincide with Ultimate's announcement of an OEM deal with Tandem Computers, Inc. the week of Sept. 14.

Epic was designed as a Pick-like operating system for Tandem hardware. Ultimate said Epic will run under the Tandem Guardian operating system, allowing applications written for Pick to run on Tandem hardware.

Exclusive rights

The $100,000 settlement was not a license fee from Ever-On but rather constituted "additional considerations" beyond the undisclosed amount Ever-On paid for Pick Systems' legal fees, said William Mitchell, general counsel at Pick Systems.

Ultimate, which already licenses the Pick operating system from Pick Systems, now has exclusive rights to Epic.

"Ultimate rolled Epic into an existing licensing agreement with us," Mitchell said. "Epic is not considered a separate operating system."

"ULTIMATE rolled Epic into an existing licensing agreement with us. Epic is not considered a separate operating system."

WILLIAM MITCHELL
PICK SYSTEMS

Pick Systems filed suit against Ever-On in October 1986 to prevent the company from licensing Epic to customers without having paid Pick Systems a licensing fee.

The Epic operating system is said to look enough like Pick that it violates Pick Systems' proprietary rights to the operating system, Mitchell said.

According to Mitchell, Ever-On has licensed the product to about two customers.

"The problem was solved when Ultimate stepped in," Mitchell added. "It was really a three-party agreement."

Symbolics reels under $25M loss

BY CLINTON WILDER
CW STAFF

CAMBRIDGE, Mass. — Ending a fiscal year that the company would probably like to forget, Symbolics, Inc. last week reported a $25.5 million loss for the 12 months ended June 30.

The maker of artificial intelligence platforms reported that revenue dropped 9% from the previous year to $103.8 million. In fiscal 1986, Symbolics concluded a stellar growth year with a profit of $10.7 million, or 41 cents per share, on sales of $114.2 million.

The 1987 loss included $14.9 million in one-time charges. A $13.7 million charge was announced in September 1986 to cover a 17% work force reduction, management reorganization and consolidation of office and manufacturing space.

Symbolics added a $1.2 million charge in the fourth quarter because of unsuccessful attempts to lease some of its office space. Symbolics recently moved back to Cambridge from what had been planned as its new corporate headquarters in suburban Concord, Mass.

Symbolics' financial slowdown typifies a trend among AI vendors. Analysts have attributed the downturn to the saturation of demand for specialized AI systems in markets such as education and to vendors' failure to succeed in the commercial mainstream because of a lack of industry-standard platforms.

Symbolics executives, however, claimed that the company has turned the corner. Noting that the firm increased revenue by 18% between the third and fourth quarters and reduced its quarterly loss by 25%, they predicted that Symbolics will return to profitability in fiscal 1988.

The firm reported a fourth-quarter loss of $1.5 million, or 6 cents per share, on revenue of $29.2 million.

Tandem builds SNA link

Multiple lines replaced by single channel tie-in

BY KATHY CHIN LEONG
CW STAFF

CUPERTINO, Calif. — Tandem Computers, Inc. this week is expected to announce an IBM Systems Network Architecture (SNA) offering that locally attaches Tandem computers directly to IBM mainframes.

The Snaxlink product is the latest device in Tandem's SNA war chest. It is scheduled to ship in the fourth quarter.

Customers currently link Tandem computers to IBM systems via multiple communications lines to a front-end communications controller. With Snaxlink, users reportedly will be able to attach a single fiber-optic link to an I/O channel of an IBM host running VTAM.

Fast times

The key advantage for corporate users will be a significant improvement in transaction speeds, said Tom Anderson, a Tandem product manager. Instead of using multiple lines running at 56K bit/sec., users can achieve speeds of up to 1M bit/sec. with a direct connection to the mainframe.

With prices starting at $49,550, Snaxlink consists of a communications interface unit for Tandem's Nonstop TXP, EXT and VLX models; a channel unit for IBM hosts; and a fiber-optic link that allows attached systems to be physically apart by up to 1,640 ft. The product has been tested with IBM 4381, 3083 and 3090 computers.

Anderson said Snaxlink will use standard SNA interfaces to the hosts, eliminating the need to modify existing applications. To use the new offering, users are required to install Snax, Tandem's SNA access software.

Experts watching the SNA market gave Snaxlink a thumbs up. Steve Randesi, vice-president of Gen2 Ventures in Saratoga, Calif., said, "Whenever you connect directly to the channel, you obtain higher speeds. It is beneficial to users who have had to use front-end processor lines to get to the host."

While other third-party vendors have developed similar connections that allow Digital Equipment Corp. computers to tap into the SNA environment, no one has introduced such a product for Tandem machines.

NCR

FROM PAGE 1

application or special-purpose processors, also scored poorly in the May benchmark tests by Neal Nelson & Associates in Chicago. The firm said the original 32/800 scored no better than the older and less expensive Tower 32/600.

Aggelakos said NCR worked with the testing firm and the complaining customers and accelerated a planned file processor upgrade. That upgrade, which had been planned for 1988, will be tested by select customers soon and will be phased into general availability during the fourth quarter, he said.

The upgrade involves replacing a 10-MHz 68010 with a 16.7-MHz 68020 and enhancing NCR's Unix implementation to support the 68020 and general optimization of the operating system code.

Aggelakos added that the multiprocessor design of the 32/800 machine makes it easier to provide such a retrofit than a monolithic architecture would permit.

He also said many customers may not want the retrofit because they have experienced no problems with the file processor, which handles much of the system's I/O and other tasks.

Meanwhile, Neal Nelson, president of the Chicago-based testing firm, said a recent retesting of the 32/800 with the enhanced file processor indicated that performance gains in the pertinent disk-intensive areas were generally eight- to tenfold.

INSIDE LINES

A change of heart. IBM last week moved to within one step of terminating its equity investment in semiconductor maker Intel. IBM announced it sold 5.9 million shares in a block transaction that, based on the closing price of Intel stock Thursday, was valued at about $327.4 million. Once holder of a 20% stake in Intel as the two companies enjoyed the mutual benefits from sales of the Intel microprocessor-based Personal Computer family, IBM has been gradually reducing its stake and now holds only 7.8 million shares, which it previously said will be exchanged for IBM Eurobonds. In a statement, IBM affirmed its commitment to Intel products and technological exchange agreements.

Prepare to repel boarders! Despite the crush of curious visitors that could besiege the famed Queen Elizabeth II, which will be docked in Boston Harbor during Decworld next week, city officials are relying on DEC and QE2 personnel to limit embarking tourists. "It's a bedroom, not an exhibition hall," said a Boston Fire Department spokesman, debunking reports that fire marshals had told DEC to limit attendees. Meanwhile, sources said, the third-generation Microvaxes will be unveiled Sept. 9, along with two Vaxstations and three Vaxservers, during a briefing at splashy harborside restaurant Anthony's Pier 4.

Squirrel behind the wall. Cullinet may have a surprise in store for its users group meeting next month — the announcement of IBM-compatible versions of the firm's IDMS/SQL, a relational data base product the company had previously indicated was being readied for the VAX. The products are said to address both the IMS and IDMS/R product lines. Although IDMS/SQL was developed by the recently acquired Esvel, Cullinet engineers have been working hard to port the code to IBM systems. The pressure was great to get the job done quickly, since industry consultants have refused to label Cullinet's own IDMS/R as fully relational.

International incident. NCR last week agreed to pay a $381,000 fine to the U.S. Department of Commerce after an investigation concluded that several of NCR's overseas subsidiaries violated U.S. policy by helping Arab nations in their boycott of Israel. The foreign units were charged with giving Arab nations information about their business partners and allegedly agreeing not to do business with certain companies boycotted by the Arabs. The fine was the largest assessed under the 10-year-old U.S. policy but only half of what NCR could have paid; the Commerce Department recognized NCR's cooperation in the investigation.

Ada, hold that plane. Boeing has long planned to develop a newfangled jetliner, called the 7J7, using a variety of advanced technologies, including a "propjet" engine and the Ada programming language for avionics. But last week, word came that Boeing will postpone the start of development for at least a year because airlines aren't interested in buying the high-tech plane yet. Another case of technology in search of customers.

Doubling up Unix. With eyes on huge contracts for government and big business manufacturing operations, fault-tolerant system giant Tandem is believed to be developing a version of Unix for its systems. The effort would be a step up from the Unix-based Altos microprocessor systems that Tandem resells, and it has been termed merely a stopgap measure. Since Tandem "still regards Unix as a necessary evil," the company will probably take the quickest route to Unix by not bothering to rework it to take full advantage of Tandem's multiprocessor machines, according to one analyst. Omri Serlin, president of market research firm Itom International, warns that Tandem must make it clear to customers that its Unix incarnation will not be a replacement for the company's proprietary operating system.

Max Headroom, move aside. American Airlines and Trintex, the videotex company formed by IBM and Sears, are teaming up to link Trintex users with the airline's Easy Sabre reservation system. Max Hopper, senior vice-president of information systems at American, played a key role in the deal and predicts it will be a boon for leisure travel.

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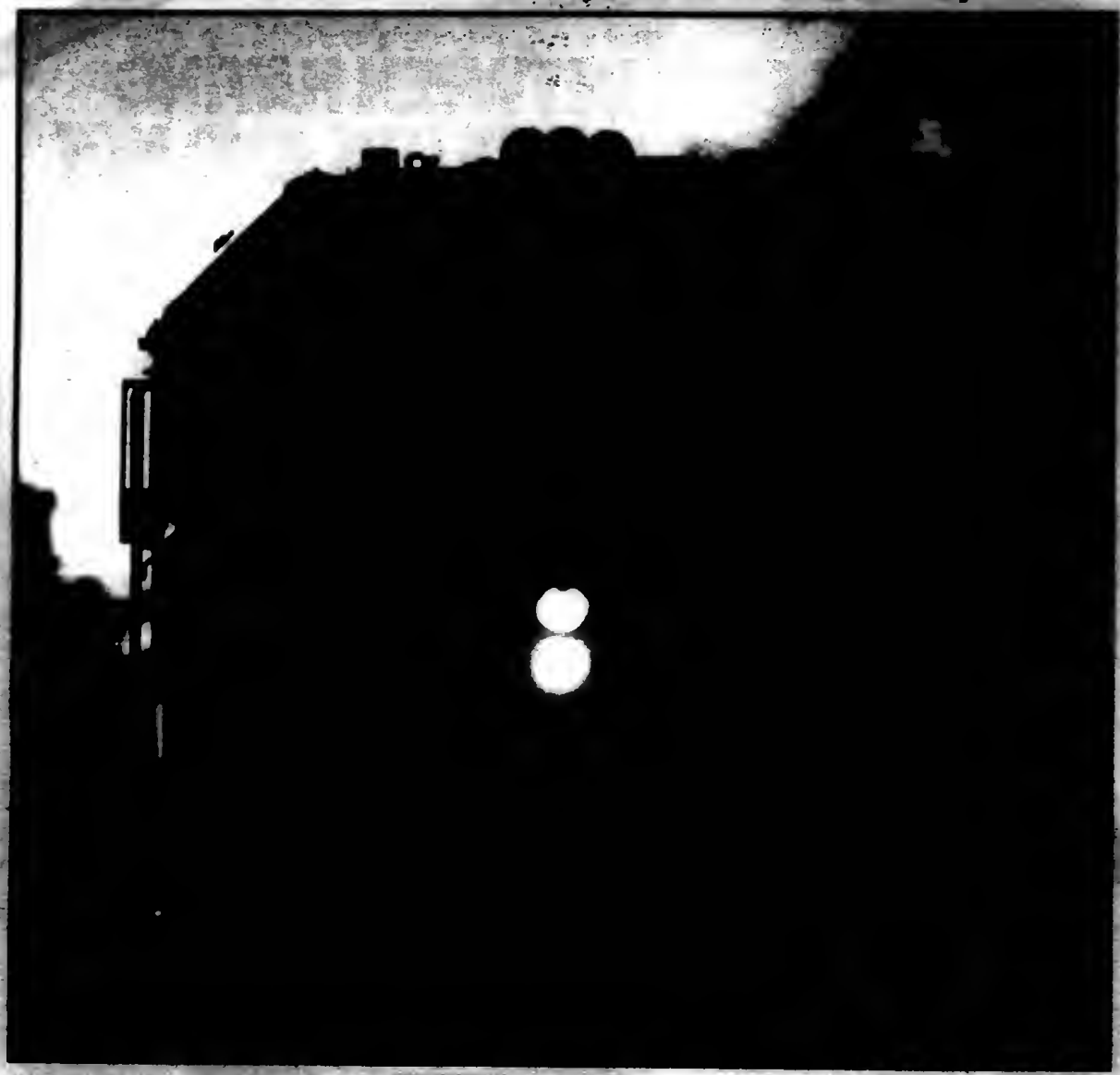

With 25,000 employees and ten different payrolls, Amtrak had a difficult task making sure everyone's paycheck arrived on time. And since they were required to pay union employees by a specified time every week, Amtrak needed software that would keep their payroll right on schedule. So they chose the Payroll/Personnel System from Management Science America, Inc.

"MSA is the undisputed leader of the software industry in the human resource arena," says Norris Overton, Amtrak's assistant vice president for Resource Management. "It evokes a tremendous confidence factor."

The MSA Payroll/Personnel System enabled Amtrak to eliminate multiple batch systems and replace them with one integrated, online, realtime system. Amtrak can now respond quickly and accurately to the more than 100 requests per week for ad hoc reports. And overtime in the human resource area has decreased considerably. According to Overton, "The accuracy and faster response time have been tremendous for the field, and we're confident that the MSA Payroll/Personnel System will meet our future needs."

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